

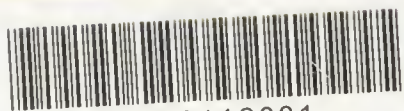
PRIMEVAL MAN THE STONE AGE IN WESTERN EUROPE

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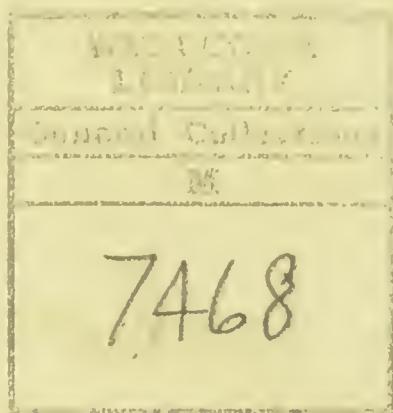
STON QUIGGIN, M.A.


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PRIMEVAL MAN

THE STONE AGE IN WESTERN EUROPE





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PRIMEVAL MAN

THE STONE AGE IN WESTERN EUROPE

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CONTENTS

	PAGE
APOLOGY	11
INTRODUCTION	13

CHAPTER I

Evidence of geology : Advent of Man : Relationship between Man and the apes : Influence of the erect attitude : Brain. Place of Man's first appearance . <i>Pithecanthropus erectus</i> . Primeval Man in Britain : Sources of evidence—human remains, artifacts, ethnology : Chronological subdivisions	Pp. 17-33
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------

CHAPTER II

Evidence of human remains : Primeval Man in Britain—Galley Hill, Tilbury, Bury St. Edmunds, Cheddar : Primeval Man on the Continent—I. <i>Homo primigenius</i> , Le Moustier, La Chapelle-aux-Saints, La Ferrassie. Other finds—Neandertal, Mauern, near Heidelberg. Type of <i>Homo primigenius</i> . II. <i>Homo recens</i> , Combe Capelle. Other finds—Galley Hill, Cheddar, Brünn : Cro-Magnon : Grimaldi	Pp. 34-52
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------

CHAPTER III

Evidence of human artifacts : Fire : Tools : Eoliths. The making of flint implements : Stages in implement-making. Palæolithic implements in Britain :—River-drift implements, Cave implements. Life of Primeval Man : Habitations : Food : Clothing and ornaments : Arts of life	Pp. 53-76
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------

CHAPTER IV

Transition from Palæolithic to Neolithic Age : Geography :
 Climate : Fauna : Chronological divisions fail. Neolithic
 Man in Britain : Relationship between Palæolithic
 and Neolithic Man : Transition period in France :—
 Mas d'Azil, Oban. Neolithic implements : Hafting.
 Neolithic monuments—Long barrows, Megaliths
 Pp. 77-99

CHAPTER V

Neolithic habitations—pit dwellings, pile dwellings, cran-
 nogs : Domestic animals : Agriculture : Primitive
 industries—basketry, pottery, textiles : Clothes
 and ornaments. General survey of the Stone Age.
 Religion Pp. 100-121

BIBLIOGRAPHY	123-124
APPENDIX	125-136
INDEX	137-140

LIST OF ILLUSTRATIONS

FIG.		PAGE
	Stone circle and alignments at Callernish, Isle of Lewis, Hebrides	
	<i>Frontispiece</i>	
1.	Outline of skull-cap of <i>Pithecanthropus erectus</i>	26
2.	Palæolithic implements from Hoxne, Suffolk.	
	From a photograph by Dr. A. C. Haddon	31
3.	Neolithic implements (Hughes Collection). From a photograph by Dr. A. C. Haddon	32
4.	Outlines of skulls of ape, <i>Homo primigenius</i> and <i>Homo recens</i>	39
5.	Map of Dordogne district	41
6.	Skull of fossil man from La Chapelle-aux-Saints.	
	From <i>L'Anthropologie</i> , xx., 1909, with the permission of Prof. M. Boule	43
7.	Combe Capelle skull, "Aurignacian Man"	49
8.	New Guinea woman making fire by friction.	
	From a photograph by A. Wilkin	55
9.	Eolith from Puy-Courny	58
10, 11.	Flint core and flakes	59, 60
12.	Acheulian implements	62
13, 14.	Mousterian implements	63, 64
15.	Aurignacian implements	65
16.	Solutrian implement	66
17.	Magdalenian implements	66
18, 19.	Representations of mammoths from French caves	74, 75
20.	Stonchenge. From a photograph by Mr. E. A. Hingston	81
21.	Typical Long Barrow and Round Barrow skulls.	
	From <i>The Study of Man</i> , by permission of Dr. A. C. Haddon	83
22.	Coloured pebbles from Mas d'Azil	87

FIG.		PAGE
23.	Neolithic arrow-heads, Ireland. Collected and photographed by Dr. A. C. Haddon	89
24.	Methods of hafting	92
25.	Bow-drill and pump-drill	93
26.	Avebury stone circle. From a photograph by Mr. A. Waterman	97
27.	Drewsteignton dolmen. From a photograph by Miss G. L. Elles	98
28.	Pile dwellings, Kaile, New Guinea. From a photograph by A. Wilkin	103
29.	Sketch of restored Swiss lake settlement. From <i>Guide Illustré du Musée de Saint-Germain</i> , by permission of Prof. S. Reinech	104
30.	Outlines of canoe from Swiss lake dwellings	104
31.	Hollowing out canoe, Keapara, New Guinea. From a photograph by A. Wilkin	105
32.	Stone miller for grinding grain, Ireland. From a photograph by Dr. A. C. Haddon	111
33.	Barvas craggan	114
34.	Spindle and whorl	116

APOLOGY

PRIMITIVE Man is becoming such a popular figure in elementary education at the present time that there seems a danger lest lively imagination and vague speculation should take the place of archæological knowledge and scientific deduction.

Many of the books wherein guidance may be sought are too technical, or too detailed, or otherwise unsuitable for the general or juvenile reader; and much of what was written before 1907 requires to be rewritten in the light of the important discoveries of later years.

This little book, the outcome of lectures to the students at Homerton College, aims at presenting in as clear and simple a form as possible the main facts concerning Man in the earliest ages, and the evidence from which these facts are derived, with illustrations drawn from the actual life of Primitive Man in the backwaters of civilisation to-day. It is hoped that by this means knowledge based on facts may take the place of invention and speculation as the foundation for the proper study of mankind.

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September 1912

INTRODUCTION

So many books have recently appeared on the early history of Man that it may be asked whether there is room for another. But after surveying these books the answer is not far to seek. The great majority of them are written for more or less advanced students, and demand some acquaintance, at least, with various branches of science. The works on prehistoric archaeology are usually too detailed for the hard-worked primary teacher or for upper forms, and those on craniology are not attractive to most readers as they require careful study. But in this, as in all other subjects, lack of interest in most cases implies lack of knowledge, and it is surprising how fascinating the study of flint implements or skulls becomes when a beginning has once been made.

As the pious, wise, and learned John Ray wrote, nearly two centuries ago, in *The Wisdom of God Manifested in the Works of the Creation* :

“Much might be done, would we but endeavour, and nothing is insuperable to Pains and Patience. I know that a new study at first seems very vast, intricate, and difficult ; but after a little resolution and progress, after a Man becomes a little acquainted, as I may so say, with it, his Understanding is wonderfully cleared up and enlarged, the Difficulties vanish, and the thing grows easie and familiar.”

Another class of book now much in vogue is that

INTRODUCTION

which seeks to combine archæology with fiction. Their popularity is due to the awakening interest in human origins and the desire to trace the cultural progress of Man, which is so marked a feature of the present day. The main difference between these books and the present volume is that in the former imagination has been allowed too much play; sequence in point of time and the geographical distribution of cultures have not been sufficiently taken into account. Thus, though the reader is carried along by a plausible story, he will find that he has something to *unlearn* when he comes to study actual facts or to read more serious books. It may be urged that precision is not necessary for young children; all that is required is to interest them and to stimulate inquiry. There are, however, those who do not recognise any incompatibility between interest and strict adherence to facts, and the special merit of the present volume is that it attempts to combine the two.

Mrs. Quiggin is no novice, having spent many years in studying the problems of recent and prehistoric uncivilised peoples. Above all she has lectured on these subjects, and it is when attempting to teach others that we discover how little we know, and how many are the gaps in the literature available. It is one thing to think that a subject is grasped; it is quite another when it has to be retailed to a questioning audience. In addition to knowledge of the literature, Mrs. Quiggin has studied in museums, and acquired a practical knowledge of basketry when describing the technique of the baskets made by the Torres Straits Islanders.¹ A practical study of this

¹ *Reports of the Cambridge Anthropological Expedition to Torres Straits*, vol. iv., 1912.

kind is an invaluable training, and the lessons thus learnt can readily be applied to other primitive industries.

The present volume was written primarily for the teachers of young children, and for these it should prove a trustworthy guide, piloting them through the dangers that beset the paths of the unwary in their excursions into popular literature. Magazines and the daily press contain many articles bearing on archaeological subjects; some of these are well-informed, others are of a more doubtful or sensational character. This little book will be of use in helping to classify the data of the one and in affording a criticism of the other.

Personally I hope that the welcome given to this little work will encourage the author to present a further volume dealing with the Bronze and Early Iron Ages, thereby rounding off the subject of prehistoric archæology.

A. C. HADDON

CHAPTER I

Evidence of geology : Advent of Man : Relationship between Man and the apes : Influence of the erect attitude : Brain. Place of Man's first appearance : *Pithecanthropus erectus*. Primeval Man in Britain : Sources of evidence—human remains, artifacts, ethnology : Chronological subdivisions

IN the beginning God created the heaven and the earth. And the earth was without form and void.

Most of us at some time or other in our lives ask, What happened at the beginning? How can we bridge over the millions of years between the time when the earth was “without form and void” and the time when Man came into his inheritance as lord of the universe?

EVIDENCE OF GEOLOGY

We know that our earth was once a blazing planet like the sun, and that it gradually cooled and cooled, and shrank in cooling, until in the course of ages the outer crust hardened into rocks. These primeval igneous¹ rocks need not concern us, but we cannot understand the history of Man from the very beginning without the help of the later sedimentary² rocks into

¹ Igneous, produced by heat. Latin, *ignis*=fire.

² Sedimentary, formed by settling at the bottom of a liquid. Latin, *sedēre*=to sit.

which the materials of the earlier rocks have been re-formed. For alterations are constantly going on upon the surface of the earth. Rain, rivers, ice, snow, and other influences are always at work. They break up and carry away the rocks from one part to lay them down as mud or sand elsewhere, and they also carry with them and bury in the mud or sand fragments of plants or animals which may chance to come in their way. In the course of countless ages these muds and sands harden into rocks, and the plants or animals contained in them are preserved as fossils.¹ It is from these fossils that we may trace the history of life on the earth from the beginning up to Man.

In the very oldest sedimentary rocks scarcely any traces are left of plants or animals. Then lowly forms of life such as worm-like and shell-bearing creatures begin to appear.² In the course of time these simple animals are succeeded by higher forms. Some early types die out, and new types arise. The earliest fish make their appearance, and enormous reptiles, some swimming in the water, some flying in the air, come into being; these are characteristic of the Secondary era. It is not until the beginning of the Tertiary era that we find the higher Mammals,³ that class of animals to which Man belongs. This gradual advance in the succession of living forms on the earth, the lowlier being succeeded by higher and higher forms, is commonly called evolution.⁴ As a general rule, the

¹ Fossil, animal or plant remains found embedded in rocks. Latin, *fodere*=to dig.

² See Appendix, Table I, second column (begin at lowest paragraph and read upwards).

³ See Note 1, Appendix.

⁴ Evolution, unrolling. Latin, *e*, *ex*=out; *volvere*=to roll.

advance is from the simple to the more complex, though the reverse process is not uncommon.

ADVENT OF MAN

Rocks and their fossils preserve for us the record of this orderly process of evolution, and with their help we can determine at what period in the earth's history Man made his first appearance. A few Mammals appear in Secondary times. These belong to the Family¹ of the Marsupials,² related to the kangaroo and the opossum; but most of the animals of the Secondary times have left no direct descendants. A few of the higher Mammals, including the half-apes or lemurs, lived in the tropical climate of early Tertiary times. In the Miocene period occur the remains of the mastodon, an early kind of elephant, the Etruscan rhinoceros, the "sabre-toothed" tiger (*Machairodus*), with upper tusks reaching below his lower jaw, and the ancestors of the apes and monkeys. Regarded from a physical point of view, Man is nothing but a Mammal, neither more nor less. So from the time that Mammals could live on the surface of the globe Man could live there with them.

But few of the species contemporary with the mastodon have survived to recent times, and there is not, as yet, any definite evidence to support the belief that Man existed so early in the world's history. It is in the next period that his advent may be looked for. In Pliocene times the fauna bespeaks a warm climate, for it includes the hippopotamus, the southern elephant (*Elephas meridionalis*), and the rhinoceros (*R. megarhinus*,

¹ See Note 1, Appendix.

² Marsupial, pouched. Latin, *marsupium*=pouch, purse.

etruscus, and *Merckii*) ; remains of an early type of ape (*Palaopithecus*) have been found ; and the discovery of a human jaw near Heidelberg, in late Pliocene or early Pleistocene times, proves that Man was already in existence (cf. pp. 46-7). Then the climate grew colder. The hippopotamus gradually disappears ; the southern elephant and the somewhat later straight-tusked elephant (*Elephas antiquus*) are replaced by the mammoth (*Elephas primigenius*), with thick woolly and hairy coat and enormous curved tusks ; the rhinoceros (*R. tichorhinus*) also had a thick warm coat, like that of a cart-horse in winter. The woolly rhinoceros was further distinguished by having two huge horns, one behind the other, sometimes two or three feet long. These great and terrible beasts, together with lions and bears, hyenas, reindeer and the great Irish deer,¹ with antlers ten or more feet across, roamed over Britain, and, dying, left their bones to be buried beneath the deposits of eaves and in the gravels of river-beds. At the same time, on the Continent, from which Britain was not yet separated, occur the remains of anthropoid apes,² and ample evidence of the existence of Man himself.

RELATIONSHIP BETWEEN MAN AND THE APES

It is evident that of all the animals which are now living in the world, those which are in their structure most like Man are the apes, and more especially the greater anthropoid apes, so it is natural to inquire if

¹ Irish deer (*Megaceros hibernicus* or *Cervus megaceros*), formerly called the Irish elk.

² Anthropoid, man-like. Greek, *anthropos* = man, *eidos* = form. The four living kinds of anthropoids are the gibbon, orang-utan, chimpanzee, and gorilla.

there is any relationship between them and ourselves. We have seen that all forms of life, plants and animals, have developed in the course of ages from earlier forms, and that in the case of the higher Mammals, with which we are immediately concerned, all the earlier forms have disappeared. So we may assume that ages and ages ago a type of animal existed with certain ape-like and certain human characters. As time went on, the descendants of this hypothetical ¹ anthropoid developed in different ways. Some became more ape-like, some became more human, and the intermediate types disappeared. There is now only a general resemblance between apes and men, but it is sufficiently close to prove that we are all descended from a common source.

INFLUENCE OF THE ERECT ATTITUDE

It is interesting to attempt to trace some of the steps by which our primitive ancestors gradually advanced from brute to man. One of the earliest, and perhaps the most important, of these steps was taken in learning to walk upright. Most of the apes have adopted an upright posture, but they are all tree-dwellers; Man alone came out into the open and learnt to walk erect on the ground. This had very important results.

By walking upright Man's hands were freed from the work of feet. Compare the fore-paws of any animal with the hands of Man, and see how much he has gained. With his hands he can feel, pick up, hold, grasp, carry, and throw things. It is easy to see what

¹ Hypothesis, a proposition put forward as a basis for argument, from Greek *hypothesis* = foundation, base (*hupo*, under, and *thesis*, placing).

an advantage this would prove in the early struggle for existence.

Next, the erect position had a notable effect on the chest. It is probably partly responsible for the development of those powers of speech which mark Man off from all the other animals. Animals certainly communicate with each other by means of sounds, but the sounds that they make seem to be very limited, while Man's capacity is almost unrestricted. By means of speech Man could communicate with his fellows, and could exchange ideas, without which no progress is possible, and so the foundations of civilisation were laid and social life came into existence.

Thirdly, think of the influence of the erect posture on the general outlook of Man. Take the example of the dog, one of the most humanly intelligent of all the animals. Go down on all fours, and discover what sort of view he has of life. It is easy to see how the change of attitude meant a broadening of Man's horizon.

BRAIN

We have left until last the greatest and most significant distinction between Man and all other animals, the distinction of brain, although it seems probable, from the evidence of embryology,¹ that the expansion of the brain preceded the adoption of an erect gait in the history of evolution. The human brain is very much larger (in comparison with the size of the body), and also very much more complex, than that of the ape. The study of the brain is as yet in its infancy, and it is not

¹ Embryology, the science which deals with pre-natal development. Greek *em* (*en*) = in, *bryein* = to swell.

possible to say what exact connection there is between the physical substance, its size, weight, or complexity, and the mental powers. A large or complex brain may not be in itself superior to a smaller simpler one; there are other factors involved.¹ Still, in early times the actual increase in the size of his brain was undoubtedly closely connected with Man's mental development.

PLACE OF MAN'S FIRST APPEARANCE

Geology, as we have seen, shows us at what period in the earth's history Man first made his appearance. Can we, by its help, gain some idea of where it was that the development took place, and what were the conditions of the earth at the time? In early Tertiary times the general geography of the world was very different from what it is now. Land masses that then were continents are now sunk deep beneath the ocean, and the floors of Tertiary seas have been thrust up into mountain ranges. We should expect to find Man's origin in a tropical or sub-tropical region, where the conditions of life are favourable, food and other necessities being provided by nature. What areas of land were there available in early Tertiary times?

Geologists trace a vast Indo-African or Austral continent, skirting the Indian Ocean, and stretching from the Cape of Good Hope through Madagascar, India, and Australia, towards New Zealand. This is proved by the fossil remains; the plants of the South African and Indian coalfields are identical; and the hippopotamus, now only found in Africa, is found in fossil form in Madagascar and at the foot of the

¹ See Note 2, Appendix.

Himalayas. Moreover, certain fossils are peculiar both to India and Africa, but are not found elsewhere.

Evidence also exists, perhaps at a somewhat later time, of a great Eur-African continent, and this is of great importance with regard to the peopling of Britain. In Miocene times there was an almost continuous land connection between Europe and Africa, and the Mediterranean Sea did not exist. In Pliocene times the Mediterranean, Black, and Caspian Seas consisted of a chain of great lakes. The Strait of Gibraltar is of comparatively recent formation. Sicily and Tunis are connected by a shallow ridge, sunk beneath the sea, and there was formerly a bridge of land between Libya and Greece. Thus there were many means of communication between Africa and Europe, both for animals and for Man.

If we look at the present distribution of the anthropoid forms allied to Man, we find that the gibbon and orang-utan live in South-East Asia and the Malay regions, and the chimpanzee and gorilla in tropical Africa. It is therefore possible that Man developed somewhere on the Austral continent, now sunk beneath the Indian Ocean, and from here, as we have seen, he would have no difficulty in spreading to all parts of the globe. It has been assumed as a hypothesis¹ that the ancestral human type or types originated somewhere in these parts in Pliocene times, and, migrating thence in all directions, became diversified in response to the varied conditions. We know how animals adapt themselves to their surroundings. For example, the stoats which live in northern lands, though reddish-brown in the summer, change in the winter to a snowy white except for the black tips to their tails. These winter coats are familiar

¹ See note, p. 21.

to us as ermine. Texture may vary as well as colour. Many animals living in cold countries grow thick furry coats, which are not needed by their relatives in warm parts. Compare, for example, the thick, shaggy hair of a Shetland pony with the smooth, silky coat of a racehorse. In the same way Man may have developed variations to accommodate himself to his environment. The thick woolly hair of the negro affords protection in a tropical climate, though unnecessary in more temperate regions, and his black skin is undoubtedly useful in the rays of a tropical sun. The influence of climate and food or other external factors on human evolution has only lately begun to attract serious attention, and much is still obscure. It suggests a possible explanation for the existing variations of mankind.

Before leaving the Austral area let us see if there is any basis of fact to support the hypothesis of Man's origin in these regions. And here we come to one of the most sensational discoveries in anthropology.

PITHECANTHROPUS ERECTUS

In 1890 Professor Eugene Dubois was stationed at Java as surgeon to the Dutch Indian Army, and by order of the Government he conducted some explorations with a view to determining the fossil remains of the neighbourhood. While digging in beds of late Pliocene or early Pleistocene age,¹ he found the roof of a skull, a fragment of jaw, three teeth, and a left thigh-bone of some animal that appeared to be neither ape nor Man. To this he gave the name *Pithecanthropus*

¹ The age of the beds is still undecided.

erectus, upright ape-man (Fig. 1). Naturally enough, this unique find gave rise to a considerable discussion, in which many divergent opinions were keenly supported. Some believe that we have here the earliest remains of Primeval Man; some think, on the other hand, that they are simian, and not human; others,

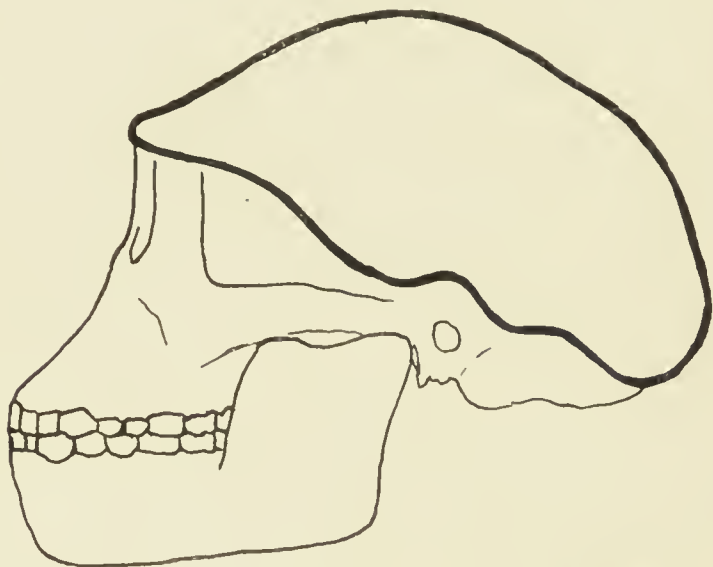


FIG. 1. Outline of skull-cap of *Pithecanthropus erectus*. The probable face outlines are added in lighter lines.

again, take the thigh-bone to be that of a man, and the skull fragment to be that of an ape. The discussion is still proceeding, and the last word will not be said for some time to come, but the weight of authority seems inclined to the belief that *Pithecanthropus erectus* represents an early human ancestor, neither wholly ape nor yet wholly man.

PRIMEVAL MAN IN BRITAIN

Let us now come nearer home, and see what were the conditions in Britain when Man first makes his

appearance. At the time when the earliest mammals were living the climate must have been much warmer than it is now, for fossil remains of crocodiles and palm-trees occur in the neighbourhood of London, where neither will live happily and naturally to-day, and the molluses then abundant were such as now inhabit the Indian Ocean. Later on sub-tropical forms appear, oaks and beeches, laurels and vines, with certain animals, such as the tapir, now only found in warmer areas. The climate grew gradually colder, oaks and vines were replaced by firs and pines, and these dwindled and dwindled until the only tree that flourished was the little Arctic willow, six inches high. The sub-tropical animals disappeared, and those that remained had thick woolly coats to protect them from the cold. Still it grew colder and colder; snow fell thickly on the uplands of North Europe, and glaciers crept further and further down the valleys; gradually masses of ice, several thousand feet thick, moving slowly southward, filled up the hollows of the Baltic and the North Sea, covered the Highlands and Lowlands of Scotland, and all but a few outstanding mountain masses of England, until a vast sheet of ice stretched almost unbroken from the Thames to the North Pole. There were oscillations¹ in climate, genial episodes, as they are called, when the temperature rose, and the snow-line rose in correspondence. Then the temperature fell, and the glaciers advanced once more. The whole period, including the genial episodes, is known as the Great Ice Age.² Why and when it occurred and how long it lasted are

¹ Oscillation, variation between certain limits. Latin, *oscillum* = a swing.

² According to some authorities we are now living in a genial episode of the Great Ice Age.

questions to which science can, as yet, give no certain answer. But it is of importance in the history of the human race, for there is sufficient evidence to prove that before the end of the Ice Age Man was living on the Continent, and at its close, if not before, we have proof of his presence in Britain.

Britain, as mentioned above, was not yet an island. The European mainland stretched out into the Atlantic some distance beyond what is now the western coast of Ireland; the shallow depression of the North Sea had not yet sunk below sea level, and the chalk downs rolled unbroken from Dover to Calais. So the great animals, such as the mammoth and rhinoceros, Man's companions in Britain, were free to wander over from France, and Man doubtless wandered across too. We will take up his history in the Pleistocene period, when the intense cold of the Great Ice Age was giving place to a more genial climate.

SOURCES OF EVIDENCE : HUMAN REMAINS, ARTIFACTS, ETHNOLOGY

In trying to reconstruct the history of Primeval¹ Man we have to rely mainly on three classes of evidence. The first and most important of these consists in the actual remains of the men themselves, their skulls and other bones. These tell us what they were like in physical type and how they differed from the men now inhabiting the globe.

Secondly, we have the evidence of handiwork, often grouped under the general name of artifacts.² To

¹ See Note 3, Appendix.

² Artifact, a thing artificially made, from Latin *ars*, *artiv*=art, and *facere*=to make.

this group belong tools, weapons, and implements of various kinds, ornaments, heaps of domestic refuse, fragments of clothing and of pottery, also remains of dwellings, traces of earthworks and ditches, erections of stones, and the paintings and carvings found on rocks or on weapons and other objects. All these prove the existence of Man, and to a trained observer tell much of his way of life.

Thirdly, we have a totally different class of evidence, and one which must be used with much greater caution. Man in the earliest times was a savage¹—that is, uncultured and unprogressive—living a life practically dependent on nature, like many backward peoples living in out-of-the-way parts of the world at the present day; and by studying the habits and modes of life of savages, how they combat and utilise the forces of nature, their primitive industries, their customs and beliefs, it is possible to form an idea of how Primeval Man must have lived, and how he must have acted under similar conditions; possibly in this way, too, we may even discover something of what he thought and believed. But we must remember that though present-day savages are primitive in *culture*, they are no more primitive in *time* than we are ourselves. They have stood still while we have advanced, but they are as many centuries removed from their primitive ancestor as we are from ours, and though stagnant in certain directions, they may be far advanced in others. For example, the Australians still use stone tools which are scarcely any better made or finished than those of the early inhabitants of Britain, and by watching their use of these we can conjure up a picture of Primeval Man at work. But in other ways they have advanced far

¹ See Note 4, Appendix.

beyond Primeval Man. Their social system is extraordinarily complicated ; the intricacies of their marriage regulations can scarcely be understood by outsiders ; and their religious beliefs, though many books have been written about them, are still a matter of dispute.

CHRONOLOGICAL SUBDIVISIONS

On reference to Table II in the Appendix, it will be seen that the last two geological periods, the Pleistocene and the Recent, are subdivided according to the successive stages of culture reached by Man. There are two main divisions, the Age of Stone and the Age of Metals, so named from the material out of which Man fashioned his tools and weapons. The Stone Age in Western Europe stretched from the earliest traces of Man's existence down to about four thousand years ago, when Man first discovered the advantage of metals, and bronze began to replace stone.

The Stone Age is thus of immensely long duration, and it is convenient to divide and subdivide it again. Leaving the various culture stages to be considered in detail later, we shall here deal only with the main periods, the Palæolithic,¹ or Old Stone Age, and the Neolithic,² or New Stone Age. These two periods present a marked contrast with regard to geography, climate, flora, and fauna, as will be seen later, but the classification rests primarily, as the names imply, on the workmanship exhibited in tool-making.

In the Palæolithic period the most typical imple-

¹ Palæolithic, from Greek *palaaios*=ancient, and *lithos*=stone.

² Neolithic, from Greek *neos*=new, and *lithos*=stone.

ments¹ (often called celts²) are roughly made of stone chipped into the required shape. It was an immensely long period, in the course of which the tool-making industry passed through many successive stages, as will be seen later (pp. 61 *ff.*). A characteristic Palæolithic implement is illustrated in Fig. 2. It is of flint,



FIG. 2. Palæolithic implements from Hoxne, Suffolk.

with a thick rounded base, adapted for holding in the hand; the upper part is roughly chipped to form a sharp cutting edge. No attempt was made to polish the surface of these early implements, and the original crust of the flint was often left on the butt end.

The typical implements of the Neolithic Age are very different from those of the preceding period; instead of being roughly chipped at one end, they are carefully shaped and smoothed, and often have a fine

¹ See Note 5, Appendix.

² See Note 6, Appendix.

polished surface all over.¹ They are usually fitted with handles, as will be described later. Roughly made tools probably continued in use in later times, but well-shaped implements, such as those illustrated in Fig. 3, may be regarded as characteristic manufactures of the period.

The implements of the Metal Ages are entirely



FIG. 3. Neolithic implements (Hughes Collection).

distinct from those preceding them, for though stone tools were still used (as indeed for certain purposes they are in the present day), Man had now discovered the advantage of metals, and made his implements first of copper, then of a mixture of copper and tin, called bronze, and later still of iron. It must be remembered that these periods which we term Palæolithic, Neolithic, Bronze, and Iron are merely relative, indicating the general characteristics of the culture of

¹ But see p. 88.

Man at a particular time. There was not necessarily a gap between the Palæolithic and Neolithic Ages, nor between the Neolithic Age and the Age of Metals, and we need not conjure up an irruption of invaders and an extirpation of the earlier inhabitants to account for the cultural advance. Possibly one man more skilled than his neighbours might make better tools, and in course of time the newer type, being found more serviceable, would take the place of the old. Even in Palæolithic times we have evidence that there were definite workshops where tools were made, and we can trace the routes by which they spread thence to areas less favourable for tool-making. Thus in one part Man might be living in a low culture stage, while in another, under more favourable conditions, he had advanced to a higher grade. For example, implements of a Palæolithic type were made and used in Ireland during the Neolithic period, and bronze was certainly in use in southern Britain before it was known in the north.

Our first step will be briefly to notice what human remains there are that can be proved to belong to the earliest or Palæolithic Age; our second to review the evidence of artifacts; and with the help of these two sources of information, supplemented by observations of the life of savages of the present day, we can attempt to draw up a picture of the life of Primeval Man.

CHAPTER II

Evidence of human remains : Primeval Man in Britain—Galley Hill, Tilbury, Bury St. Edmunds, Cheddar : Primeval Man on the Continent—I. *Homo primigenius*, Le Moustier, La Chapelle-aux-Saints, La Ferrassie. Other finds—Neandertal, Mauer, near Heidelberg. Type of *Homo primigenius*. II. *Homo rexeus*, Combe Capelle. Other finds—Galley Hill, Cheddar, Brünn : Cro-Magnon : Grimaldi

EVIDENCE OF HUMAN REMAINS

WHEN we come to examine the actual human remains belonging to the earliest or Palæolithic Age in Western Europe, we find that they are extremely rare. There are several reasons why this should be so. First, it is very seldom that the bones of any animal as small as Man are found at all, and it is only under very favourable circumstances that, if discovered, they survive their discovery ; owing to their extreme age (which is placed by most authorities at a minimum of about 20,000 years¹) they crumble to dust at a touch. Moreover, Man at this early age was already, like his cousins the apes, endowed with more vigilance, ingenuity, and agility

¹ There is no accepted chronology for the Palæolithic Age. Sollas (*Ancient Hunters*, 1911, chap. xiv.) fixes the end of the Palæolithic Age 17,000 years ago, or less. Keith (*Ancient Types of Man*, 1911, p. 30) regards 180,000 to 200,000 years as a moderate estimate. Others, with no less authority, prefer to reckon in millions (cf. Duckworth, *Prehistoric Man*, 1912, Preface).

than many of the larger animals. Hence we may suppose that the accidents which have best preserved for us the fauna of Tertiary times, bogs, swamps, and sudden floods, engulfed such unwieldy creatures as the rhinoceros and mammoth, while Man and the apes escaped. These, dying a natural death in caves or in the open, would leave no traces of ever having existed. If they were not eaten by hyenas or other beasts, or even by their fellows, their bodies would soon crumble away, and their bones be scattered by wind and rain.

Hence we do not expect to find the remains of Man of the very earliest times in any abundance. In fact, there are scarcely two dozen finds that are accepted as unquestionable. For it is extremely difficult to determine whether prehistoric remains are those of Primeval Man or not. And here again the question is mainly one for geology to answer. If the human skeletons or parts of them are found buried *under undisturbed soil* to which a definite date can be assigned, or if they are found together with bones of *animals*, such as the older types of elephant or rhinoceros, *which became extinct* at a later date, or if owing to any other circumstances their extreme antiquity can be proved, there is no further question. But this is very rarely the case. When the remains of animals are found preserved as fossils we can be certain that the animals must have died when the stratum of rock in which they are found was being formed, and so we can fix their geological date. With Man it is different. Animals were buried by nature. But even in the earliest times we have evidence that Man was buried by Man, and hence the most important proof of his geological date is rendered very uncertain. The very few remains claimed to be those of Primeval Man found in England have been

peculiarly unfortunate. Let us briefly notice the four most important of these, the skeletons from Galley Hill and Tilbury, the skull found in one of the Cheddar Caves, and the portion of a skull from Bury St. Edmunds.

PRIMEVAL MAN IN BRITAIN : GALLEY HILL

It has been claimed for the Galley Hill Man that he is the oldest representative of Primeval Man not only in Britain, but in the world.¹ He was found in September 1888, in a gravel pit at Galley Hill, near Northfleet, Kent, and in similar adjacent gravels were the bones of hippopotamus, woolly rhinoceros, and mammoth. We know that rivers are constantly wearing away the valleys in which they flow, by carrying along with them the mud, sand, and pebbles in their beds, to drop them lower down. It gives us some idea of the age of the gravel in which the bones of the Galley Hill Man were found when we realise that at the time that they were being washed down and dropped in the position in which they now lie, the Thames was meandering over a wide valley more than ninety feet above its present level. Unfortunately the discovery was not published for several years (1895), and by that time doubts had arisen. Were the bones of the extinct animals actually found in the same deposit as the human bones? Were the human bones found in undisturbed soil, or were they buried in later times? As the actual spot at which the discovery had been made had been quarried away by the time these questions were asked, they can

¹ A. Rutot places the Galley Hill Man in pre-Palæolithic—that is, in Eolithic—times (*cf.* p. 58), but the evidence is unsatisfactory.

never be satisfactorily answered, and the actual date of the Galley Hill Man will always be disputed. As far as can be judged from the very broken and imperfect portions of the skeleton, his general appearance resembled that of authentic examples of Primeval Man, and to this point we shall return later (p. 50).

TILBURY

In 1883, during excavations made while enlarging the docks at Tilbury, portions of a skeleton, including the top of the skull (now preserved in the Natural History Museum in London), were found buried thirty-two feet deep in a bed of sand. But neither the age of the bed in which the discovery was made, nor the association of bones of extinct animals, nor implements of primitive type, proved conclusively that the remains belonged to the Palæolithic Age, and they have always been regarded as doubtful.

BURY ST. EDMUNDS

The fragment of a skull found at Bury St. Edmunds in 1882, in a deposit of red loam which had been formed long before the excavation of the valley of the Linnet, rests on better geological evidence, especially as in similar deposits close by were found bones of the mammoth, and flint implements of early types. But the skull scarcely survived its discovery. Only a little piece of the top of the skull, not more than five inches long, was intact, and shortly afterwards, in travelling through the post, this precious fragment was broken into so many pieces that it could not be put together again.

CHEDDAR

The fourth skull claimed to be that of Primeval Man was found covered with stalagmite¹ in Gough's Cave at Cheddar in 1904, together with bones of the woolly rhinoceros and the giant Irish deer, the cave bear and lion. The skull is in a very fair state of preservation, but it cannot be certainly proved that the owner was actually a contemporary of the extinct animals. All appear to have been washed down together into a crevice, but it must always remain somewhat doubtful whether they were actually living at the same time, or whether Man may not have been a later occupant of the cave.²

PRIMEVAL MAN ON THE CONTINENT

Although Primeval Man in Britain is thus unsatisfactorily represented, more evidence is being brought to light year by year on the continent of Europe, so that we can begin to gain some idea of what he was like. Just as Man varies to-day in different parts of the world, and two or more anatomically differing groups may be found living side by side, so even in the earliest time Man was not everywhere the same. Anthropologists distinguish two main types: *Homo primigenius* and *Homo recens*.³

Homo primigenius is what is commonly described as a "low" type. That is, he possessed certain features in which he differed from modern Man and showed

¹ See p. 41 n. 1.

² See p. 50.

³ Or *Homo sapiens*. Duckworth (*Prehistoric Man*, p. 60) classifies *Homo sapiens* as a variety of *Homo recens*.

closer resemblance to the apes. Among ape-like characters we notice a retreating chin, with massive jaws and teeth, a retreating forehead, with a low crown to the head, and a continuous bony ridge overhanging the deep-set eyes.

The skull of La Chapelle (Fig. 6, p. 43) may be taken as a typical representative of *Homo primigenius*.

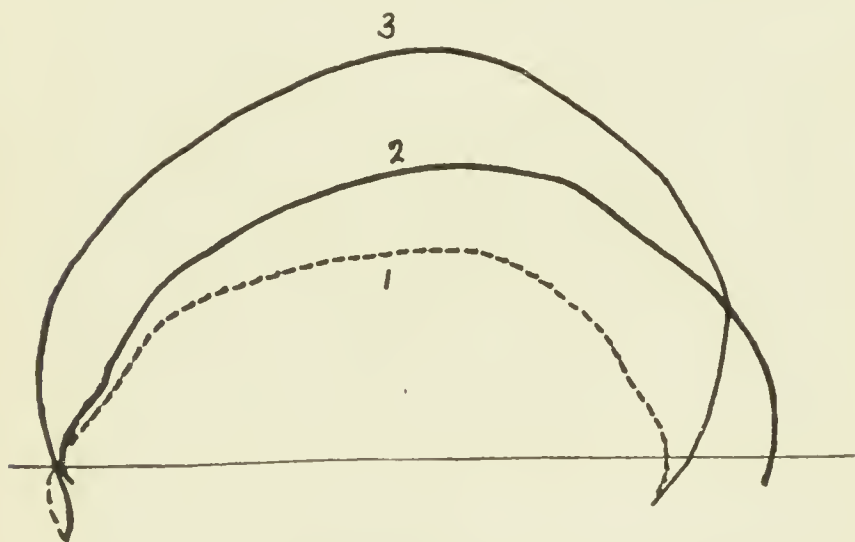


FIG. 4. Comparison of outlines of skulls of ape, *Homo primigenius*, and *Homo recens*.

1. Anthropoid. 2. Neandertal (v. p. 45). 3. Modern Man.

Homo recens is the group to which modern Man belongs. He shows none of the characteristic ape-like features described above. The forehead is well developed, with a fairly high crown, the ridges over the eyes are less strongly marked, and not continuous, the jaws and teeth are smaller, and the chin stands prominently forward in a straight line with the forehead. For a comparison of the cranial outlines of *Homo primigenius* and *Homo recens* see Fig. 4, where the

marked contrasts in the shape of the forehead and the back of the head, and the relative height of the crown, are clearly shown. Here also is to be noted the still greater contrast between the lowest Man and the highest ape.

I. HOMO PRIMIGENIUS

The Dordogne district in the south-west of France (see Fig. 5) is particularly rich in remains of Primeval Man. On the borders of Corrèze, on the banks of the Vézère, are the celebrated caves of Les Eyzies, explored in 1863, and those of Combarelles and Font de Gaume, on whose walls Primeval Man has left such marvellous examples of his artistic skill. Not far off is Cro-Magnon, where no less than five skeletons were found, and those of Laugerie are scarcely less important. And among the most famous discoveries of late years, those of Le Moustier, of La Chapelle, and of La Ferrassie are all included in the same area.¹ What were the circumstances which attracted Man to this region?

The prime necessities of Man in any age are food and shelter, and in the Dordogne district in early times both could be very easily obtained. The country was covered with forests filled with game, and prairies over which roamed herds of wild horses and cattle; these, together with fish from the many streams and rivers, furnished abundant food for a prehistoric settlement. Shelter was provided by nature under the overhanging cliffs and in the caves or long winding galleries which, as in most limestone districts, run for

¹ La Chapelle and La Ferrassie are beyond the limits of the sketch map, to the east.

long distances into the depths of the earth. Any one who has seen the limestone caves of Somerset, Yorkshire, Derbyshire, or elsewhere, knows how the water,



FIG. 5. Map of Dordogne district, showing the principal caves and prehistoric stations.

charged with carbonate of lime, dripping through the roof, forms pendent fringes and tapering rods like icicles, called stalactites.¹ In the same way the whole

¹ Stalactite and stalagmite, from Greek *stalassein*=to drip.

floor is often covered with a coating of carbonate of lime (stalagmite), rising up here and there in pinnacles to join a stalactite hanging from the roof above, so forming a column from roof to floor.

Anything that is deposited on the floor of such a cave is sealed up under the layers of stalagmite, and by soil washed in through cracks in the roof, or by the falling-in of the roof itself. In these various ways bones and implements of Primeval Man have been preserved through countless centuries.

LE MOUSTIER

The Dordogne caves seem to have been used more for occasional retreat than for constant occupation. All the shelter these hardy hunters required was obtained under the rock-shelters or recesses in the rock with overhanging ledges, in which the cliffs abound. The Vedda of Ceylon live in exactly the same kind of rock-shelter at the present time. Possibly the caves were used as burial-places, for in the cave of Le Moustier was found in 1908 the famous skeleton which bears its name. As few authorities would place the date of his death at less than 20,000 years ago, we cannot expect that his bones would be well preserved. The skeleton was nearly complete, and appeared to be that of a boy about eighteen years old, but a great part of it crumbled away when the workmen tried to remove it from the earth in which it was buried. From the position of the bones it was evident that the boy had been buried in the attitude of sleep, his cheek resting on his right elbow and his left arm hanging down. A flint dagger had been placed under his left hand, and the bones of wild oxen buried with him indicate

the universal custom of providing food for the spirit on its long journey to another world.

LA CHAPELLE-AUX-SAINTS

In the same year in which Otto Hauser found the Le Moustier boy in Dordogne, a skeleton of an old

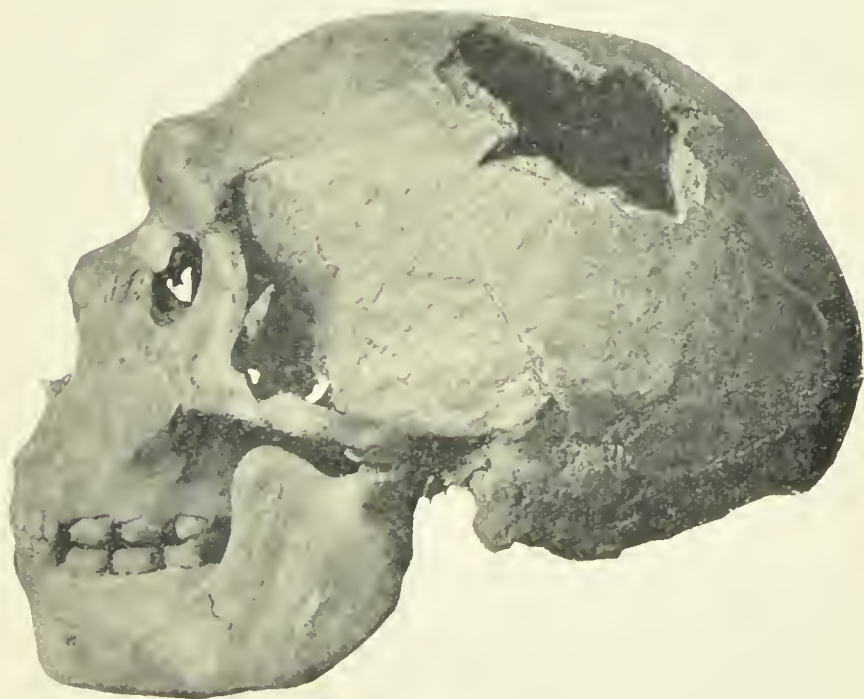


FIG. 6. Skull of the fossil Man of La Chapelle-aux-Saints, with nasal bones and jaws restored. Typical example of *Homo primigenius*.

man, belonging apparently to the same period, was unearthed by the two French priests A. and J. Bouysonie, who, with L. Bardon, had been for several years exploring the caves in the neighbouring department of Corrèze. La Chapelle-aux-Saints, the little village near the cave, is about fourteen miles south of

Brive, on the borders of Lot. The La Chapelle Man had evidently been buried. He was lying on his back, his head to the west, protected by some large pieces of stone, and, as in the Le Moustier grave, there were indications that food had been buried with the dead. The skull was restored and studied by Professor Boule, of Paris (Fig. 6).

LA FERRASSIE

Not far from Le Moustier and La Chapelle, at La Ferrassie, in Dordogne, a complete skeleton was found by Dr. Capitan and M. Peyrony in excavating at the foot of a limestone cliff in September 1909. The soil over the skeleton was absolutely undisturbed, and as layer after layer was carefully removed the exact position of each bone was clearly seen. It is impossible to say whether the La Ferrassie Man had been buried. His attitude was that of sleep. He lay on his back, with his legs drawn up to the right, his right arm raised, and the left arm hanging down by his side. His head was bent backwards and his mouth wide open, "all indicating," as an observer remarked, "the attitude of a dying man whose last sleep had been respected." Two large stones were placed on either side and two or three more over the head, while the body was almost covered with splinters of large bones.

OTHER FINDS

Judging from the geology and geography of the country and the comparative abundance of the human remains, the Dordogne district afforded a favourable site for primeval settlements. Similarly suitable conditions

were to be found in the area through which runs the frontier line separating Belgium from Germany. Here the tributaries of the Meuse and the Rhine have cut their way through the limestone, carving out gorges often fifty or more feet deep. And as is so often the case in limestone districts, these cliffs are full of rock-shelters and caves, which here, as in France, furnished homes for Primeval Man, and have preserved traces of his occupation, and occasional fragments of his bones.

To this area belong the earliest and the most famous of all the discoveries of Primeval Man. In Belgium, at Spy, near Namur, on a terrace at the mouth of a cave on the banks of the Orneau, two skeletons were found in 1885, together with bones of the mammoth; at Engis, on the Meuse, not far from Spy, the roof of a human skull was discovered; further south, near Dinant, are the caves of Furfooz, in one of which, La Naulette, a human jaw was found in 1866 together with fossil bones of elephant and rhinoceros.

NEANDERTAL

Over the German border, not far from Düsseldorf, occurred the most famous remains of all. Some workmen were digging in a quarry in the Neander ravine on the banks of the Düssel, a tributary of the Rhine, when they came upon the skeleton of a man embedded in the rock. Unfortunately it was so badly damaged in being removed that they kept nothing but the top of the skull¹ and a few long bones.

Up to this date the orthodox belief that Man was created in 4004 B.C. was generally accepted, so that no one speculated much about fossil Man. Occasional finds

¹ For the outline of the Neandertal skull see Fig. 4, p. 39.

of stone implements, or other indications of human existence contemporary with extinct animals, were beginning to be a puzzle, but were regarded as relics of a people overwhelmed in the deluge at the time of Noah. It was, however, impossible to account for the Neandertal remains in this way. They were undoubtedly fossilised, they were undoubtedly more than four thousand years old. The next question was : Were they human ? Some maintained that they were human ; others claimed that they were human, but diseased ; others again—and this is the general opinion at the present day—regarded the remains as being those of Primeval Man, and as representing the most ape-like type yet discovered. The discussion raged for about thirty years, until further discoveries, such as that of the two skeletons at Spy, placed the existence of fossil Man beyond a doubt. This controversy, in which the most distinguished scientists of the day took part, gave such a notoriety to the Neandertal find that the name is often applied to all remains showing the same physical type, and we read of Neandertal Man, or the “ Neandertal race.”¹ The name is now given up in favour of the term *Homo primigenius*.

MAUER, NEAR HEIDELBERG

We have touched briefly upon some of the most famous finds of *Homo primigenius*, the skeletons of Le Moustier, La Chapelle-aux-Saints, and La Ferrassie, and the Neandertal cranium.² Lastly, we have to notice a still smaller piece of evidence, which is yet of greater antiquity

¹ For the proper use of the word *race*, cf. Note 13, Appendix.

² Two finds in Moravia and the Gibraltar cranium are briefly noted in the Appendix, Note 7.

and interest than them all, being the oldest portion of Primeval Man yet found whose date can be certainly fixed by geology. This is the Mauer jaw, or, as it is often called, the jaw of *Homo Heidelbergensis*, which was found in 1907 at Mauer, near Heidelberg. It lay in the sand deposited by the river Neckar many thousands of years ago, when its course was very different from its present one. With it were thirty-five species of molluscs and fourteen types of mammals. The former are all still found in Europe, though eight of them have migrated further east, showing that the climate round Heidelberg was more continental in early times. The animals belong to the early part of the Pleistocene period (for example, the straight-tusked elephant, *E. antiquus*), but the Etruscan rhinoceros, which is abundant, is more characteristic of the Pliocene than of the later Pleistocene. The jaw is thus immeasurably older than any human remains hitherto discovered; it is also markedly less human. In the entire absence of chin projection and the extraordinary thickness of the bone, it resembles a gorilla far more than a man; the slope of the ascending portion suggests an enormous gibbon, though in general features it approaches more nearly to the orang-utan. Happily, however, the jaw is complete; it possesses its full complement of teeth, and these are unquestionably human. They are large, certainly, though not larger than can be found among some of the Australian aboriginals of the present day, and the characters of the canine teeth, which do not project beyond the teeth on either side of them, and of the wisdom teeth (third molars), which are smaller than the others, make it certain that the jaw could never have belonged to any other species than Man. Both

geology and anatomy place *Homo Heidelbergensis* in the ancestral line of *Homo primigenius*.

TYPE OF HOMO PRIMIGENIUS

With the help of such evidence as we have described we can try to picture the physical features of *Homo primigenius*. He was short of stature, probably not more than two or three inches over five feet, with relatively long back and short legs, and knees slightly bent. His large head, with broad face and wide, sunken nose; his projecting, chinless jaws, with rows of powerful teeth; his retreating forehead, sloping back from above heavy bony brow ridges, which overhung deep-sunk eyes, must all have given him a fierce and repellent appearance, which might even be described as brutish. Nevertheless he was, in the most important of all distinctively human characters, further removed from the brutes than we are ourselves. For his large head contained more actual brain space than is common among civilised peoples of the present day. It is thus clearly seen that it was brain, not brawn, that raised Primeval Man to his place as lord in the animal world.¹

On p. 38 we saw that as far back as any trace of Man can be found he was not everywhere the same, but showed two distinct types, one of which has been called *Homo primigenius*, while the other is the great species to which we all belong, *Homo recens*. We must next see what early evidence there is of *Homo recens*.

¹ See Note 8, Appendix.

II. HOMO RECENS

COMBE CAPELLE

In the year following the discovery at Le Moustier, about five miles away at Combe Capelle (in the



FIG. 7. Combe Capelle skull, or "Aurignacian Man."
Fossil example of *Homo recens*.

valley of the Couze, not far from Montferrand-Périgord), Hauser discovered the complete skeleton to which he gave the name *Homo Aurignaciensis*, commonly called the Aurignacian or Combe Capelle Man (Fig. 7). In appearance he must have presented a strong contrast to the Neandertal type. The most obvious characteristics of the former are the low

crown of the head, the forehead sloping back directly above the bony ridge that overhangs the eyes, the projecting jaws and sloping chin. In all these points the Combe Capelle Man shows a higher type. In place of the low, flat crown he has a high, well-developed forehead, with a curve similar to that of modern Man. The bony ridges over his eyes are less prominent and do not form an unbroken line, while his jaws project little, if at all, beyond the face-line. The chin has been described as a transition between a negative and a positive chin. The long bones also show a better proportion, they are straight and slender where those of *Homo primigenius* are thick and curved, and numerous details indicate an advance in development.

OTHER FINDS : GALLEY HILL, CHEDDAR, BRÜNN

This is the only complete skeleton belonging to the higher type which can with certainty be referred to Palæolithic times, and, as will be seen below (pp. 63-4), it is considerably later than any of the remains of *Homo primigenius* described above. There are, however, other remains, whose geological date is not absolutely certain, but which in type so closely resemble those of Combe Capelle that, awaiting further evidence, they may be grouped together. The most interesting of these is the skeleton found at Galley Hill, Kent, described on p. 36 above. Such information as could be obtained from the very fragmentary state of the skull indicated a type closely resembling that of *Homo Aurignaciensis*. The Cheddar Cave Man, referred to on p. 38, is also placed in the same group. In 1891 Professor Makrowsky discovered the

skeleton of a man, together with bones of mammoth and rhinoceros, at Brünn, in Moravia. Round the neck was a necklace of more than 600 fossil dentalium shells, and pieces of mammoth teeth and ribs and rhinoceros bone, all bored with holes, were found in the grave. More remarkable still was a fragment of a carving in mammoth tusk representing a naked man with well-shaped head wearing a beard. Unfortunately very little of the whole skeleton survived its discovery, but the skull apparently coincided in general features with those of Combe Capelle and Galley Hill.

This group is often called, from the most complete and well-dated example, the AURIGNACIAN type. Two other important finds, those of Cro-Magnon and of Grimaldi,¹ show that this was not the only representative of *Homo recens* in the Palæolithic Age.

CRO-MAGNON

CRO-MAGNON is the name of a rock shelter near Les Eyzies, in Dordogne (see map, p. 41). In 1868, in excavating a railway cutting in the valley of the Vézère River, five almost entire skeletons were found by E. Lartet.² These differ from the Aurignacian type in certain characters, notably in the width of the face, the better-developed chin, and the tall stature, the average height being little under six feet. Many

¹ Up to the time of the International Congress at Monaco in 1906 these were called the caves of Mentone, or Baoussé-Roussé (red caves).

² The actual date of the Cro-Magnon skeletons is disputed. They were found in a recess which had been concealed by a heap of Palæolithic rubbish, and they may belong to a transitional period.

skeletons of the same type have been found in the shelter of Laugerie Basse, and at Chancelade, both in Dordogne, in the Duruthy Cave (Landes) and the Placard Cave, Rochebertier (Charente).

GRIMALDI

The caves near Mentone have yielded even more abundant remains of Primeval Man, for no less than sixteen skeletons, not including various fragments, have been found at different times from 1872 onwards. Most of these are of the Cro-Magnon type, but two skeletons buried together, those of an old woman and a young man, found by the Prince of Monaco in 1901, show certain resemblances to a negroid type. This find is so far unique, no other types with similar features having been discovered. It serves to show that at least four human types¹ already existed in early times: the Neandertal type, *Homo primigenius*, and the Aurignacian, Cro-Magnon, and Grimaldi types, representing three varieties of *Homo recens*.

¹ See Note 9, Appendix.

CHAPTER III

Evidence of human artifacts : Fire : Tools : Eoliths.
The making of flint implements : Stages in implement-making. Palæolithic implements in Britain :—River-drift implements, Cave implements. Life of Primeval Man : Habitations : Food : Clothing and ornaments : Arts of life

EVIDENCE OF HUMAN ARTIFACTS

DURING the great eruption of Vesuvius in A.D. 79 the city of Pompeii was buried under a shower of cinders, red-hot stones, and ashes to a depth of several feet, and lay unremembered, its very site forgotten, for about seventeen centuries. Since 1763 careful excavations have revealed more and more of the ancient city. We can trace the plan of the streets, lay out the gardens, reconstruct the houses, recognise which were dwelling-houses and which were shops, see where the bread was baked, where hot drinks were sold, and follow in some detail the daily life of the time.

Out of a buried past archaeology tries to reconstruct the life of Primeval Man, but, owing to lack of material, the picture is far from being complete. Pompeii was buried for nearly two thousand years, but ten, or perhaps a hundred, times two thousand years stretch between us and the earliest traces of Man's life, discoverable here and there in the caves or river-

gravels of Western Europe. At Pompeii the actual food of the inhabitants has been preserved for our information, but of the earliest human times nothing less durable than stone, antler, or solid bone has survived the centuries. Bone and antler were not worked in the primary stages of tool-making, no traces of wood remain, and all the more fragile materials have long since crumbled away, so that our only evidence of Man's handiwork is found in his *stone implements* and the charred remains of his *fires*.

If we go back many, many thousands of years to the beginning of Man's life on the earth, and see him living merely as one animal among others, we wonder how it was that a creature so poorly equipped for the struggle should survive at all among his savage companions. Many surpassed him in size and weight, many in speed and swiftness, most were endowed for defence with woolly coat or tough hide, and for offence with teeth and claws. How did Man not only hold his own, but gain dominion over the beasts of the field? Undoubtedly two main factors were the *use of tools* and the *use of fire*.

FIRE

We need not stop to inquire how Man first became acquainted with the use of fire, whether by a stream of molten lava, by lightning, by the friction of one branch on another in a tropical forest, or by some other natural means. Although many stories have been told to the contrary, no savages have yet been found who are ignorant of the use of fire, or without means of preserving it; but there are people¹ who do

¹ In the Andaman Islands.

not know how to make it for themselves, and should the ever-smouldering fire of a household chance to die out, a brand has to be borrowed from a neighbour.

There are two primitive methods of making fire: by friction¹ and by percussion.² The most widely spread



FIG. 8. Woman from Hula, New Guinea, making fire by friction. Fire-plough, or "stick and groove."

device for producing fire by friction is by means of the fire-drill. The fire-maker twirls a stick vertically between his hands so that its point drills a hole in a softer piece of wood. The fire-plough, though not so widely known, is equally simple; here the stick is

¹ Friction. Latin, *frictionem* = rubbing.

² Percussion. Latin, *percussionem* = striking.

worked up and down the stationary piece of wood, so making a groove, as seen in the illustration from New Guinea. By either method the friction and the wood dust combine to create a spark, which is conveyed to a piece of tinder, such as dried grass or leaves. One or other of these methods (with improvements) seems to have been employed in all parts of the world, but no traces of such perishable mechanism could survive from the days of Primeval Man. The earliest evidence that has come down to us shows that in the Stone Age fire was already obtained by percussion. The upper beds of the chalk are full of flints, and the lower beds of iron pyrites. This happy juxtaposition no doubt led to the discovery—perhaps in shaping a flint with a hammer-stone of pyrites—that a spark could be produced and dry leaves or other tinder lighted in this speedy fashion. With fire as his ally Man had a great advantage over his fellow animals. He was armed both for defence and for attack. A camp fire is still the universal method by which Man guards himself from the wild beasts of the forest, and a blazing brand is one of the most effective weapons at close quarters. Fire was also of inestimable service in more peaceful ways. With fire Man was able to warm himself, to cook his food, to turn inedible into edible food, to burn down trees and to clear the forest, while the hearth developed naturally into a social centre and became a factor of great importance both in industrial and in family life.

TOOLS

When, by walking upright, Man's fore limbs were no longer needed as supports, they were free to pick

up and hold or throw sticks, stones, or any other objects. These could be used as missiles or striking weapons, and they could aid in the daily quest for food. With a stone Man could hammer and pound up various roots and fruits ; he could break the shells of molluscs or other edible creatures, and so increase his food-supply, a most important matter for Primitive Man. With stones and sticks he could ward off enemies, and with well-directed shots or blows kill small animals or birds.

Then he would find that a shaped stone would do far more work than an unshaped one, and he would chip it and shape it to give it an edge for cutting, and so enormously increase its usefulness. With a sharp edge he could cut down trees and build shelters ; he could dig holes in the ground for storehouses or to increase the warmth of his hut ; he could hollow out trees to make canoes ; he could cut up and scrape hides for clothing, besides being excellently equipped for slaughtering his neighbours or killing large animals either for food or in self-defence.

These earliest implements must have been of a very simple character. A rough stone would be picked up and hammered with another stone to improve its shape. And it is obviously impossible, when such stones are found, to say if they were chipped by Man, or owe their shape to natural or accidental causes, such as being rolled about by water, ground along by ice, crushed in landslips, &c. Nevertheless, when a large number of rudely chipped stones are found, all much of the same shape, and that shape apparently a useful one (Fig. 9), it seems probable that we see here the earliest handiwork of Man. These rudely chipped stones are called coliths.

EOLITHS

Eoliths¹ have been found in various parts of the world, and their discoverers have claimed for them a vast antiquity stretching back to a time long before the early Pleistocene Age (in which the first certain

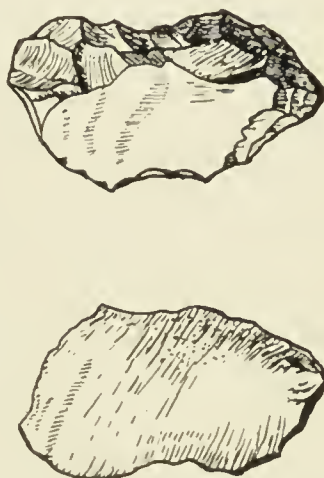


FIG. 9. Eolith from Midde Miocene deposits, Puy-Courny (Cantal).

traces of human bones have been found, p. 47), to Miocene and even earlier periods. But it is difficult to prove that the specimens of eoliths hitherto discovered show more than *accidental* chipping. When it can be shown that the chipping exhibits definite *intention* it must be recognised as certain evidence of Man's existence, since no other animal is a tool-maker. At present eoliths are not definitely accepted by most authorities as human artifacts, though there must have been some stage of rude workmanship which Man passed through before reaching the higher grade of

¹ Eolith. Greek, *eos*=dawn, and *lithos*=stone.

skill shown by the tool-makers of the Palæolithic Age.

THE MAKING OF FLINT IMPLEMENTS

We are not altogether without information as to how Primeval Man made his stone implements, as stone

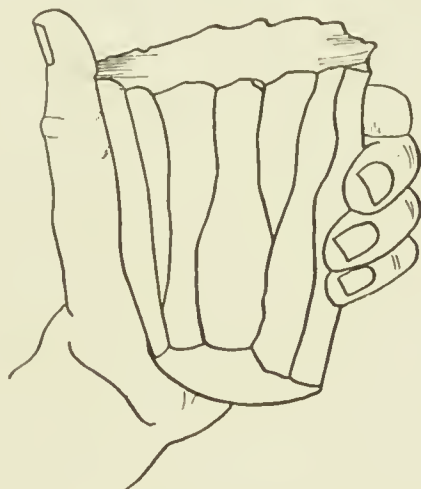


FIG. 10. Flint core, after flakes have been struck off.
The curved surface below is part of the original outer crust of the lump of flint.

implements are being made in various parts of the world to-day both by savage and by civilised Man. For although we have now advanced through the successive ages of Stone, Copper, Bronze, and Iron to that of Steel or Electricity, we have not altogether given up the use of stone tools. We use a millstone for grinding our corn, a stone pestle and mortar for pounding up our food, and flints are still chipped into shape by hand for flintlock muskets.

Flint differs from most other stones in the way in which it splits when struck, and it is this peculiarity

which makes it a favourite material for stone implements. The great majority of the British implements are of flint, and when they are of other materials it is usually because they were made in a district where no flints occur. When a lump of flint is struck with the right force at the right spot it splits very easily, leaving a smooth surface both on the sharp-edged *flake* and on

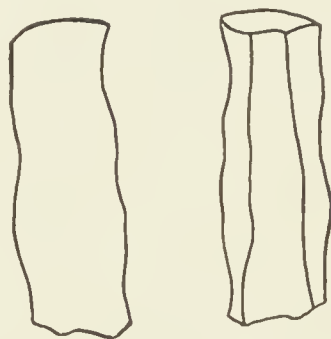


FIG. 11. Flint flake, front and back.

the *core* (see Figs. 10, 11). By repeated blows the core can be chipped to the required size and shape and trimmed round the edge by pressure with a piece of bone or wood. This was the way in which Man made his first implements, and it is the way in which to this day the Eskimo make their knives and the Fuegians their spear-heads. In earlier times it was the core that was chipped down to form the tool; later on the core was thrown away and the tools were made of the sharp-edged flakes, chipped and trimmed into serviceable shapes. In this and other ways the art of tool-making shows a distinct development, with increase of skill, new inventions, and variations in types from earlier to later times, and thus successive stages can be recognised (see Table II, p. 126, Culture Sequence).

STAGES IN IMPLEMENT-MAKING

These stages in the development of tool-making must have succeeded each other very slowly, for they are accompanied by changes in climate, and also in plants and animals, showing that many thousand years separated the earlier from the later periods. They are named either after the *characteristic animal* living in the period, or from the *places* where typical implements have been found. The earliest implements which all authorities recognise as showing Man's handiwork are those belonging to the CHELLIAN period, so named from Chelles, on the Marne, eight miles east of Paris. The climate at this time was warm and damp, with the hippopotamus as the characteristic animal. Hence this stage is often called the AGE OF THE HIPPOPOTAMUS. The commonest implement was the pear-shaped type figured on p. 31.¹ It is made in the simplest way by chipping pieces off a lump of hard stone until the core is of the required shape. It is a handy and effective tool, and examples are found in many parts of the world. No pieces of bone, antler, or ivory belonging to this period show artificial working, and there is very little variety in the stone implements.

The next stage is the ACHEULIAN, so called from Saint-Acheul, near Abbeville, in the Somme valley. It is often included in the Chellian, though it shows a distinct advance in culture, and must be much later,

¹ Besides the general and vague name "celt" (see Note 6, Appendix), these are also called "Chellian axe," *coup de poing*, *Beil*, or *Faust Keil*. As we have no satisfactory name for these implements, Sollas (*Ancient Hunters*, p. 75) proposes the name "boucher," in memory of Boucher de Perthes, the first to convince the scientific world of their significance.

as the climate and fauna were already changing. The *warm damp* was giving place to *cold damp*, and the hippopotamus was becoming rare, the characteristic animal being the mammoth. The Acheulian period marks the transition between the two. A typical



FIG. 12. Acheulian implements, smaller and more carefully made than in the preceding stage, and showing secondary chippings.

implement is illustrated in Fig. 12; it is smaller and lighter than the Chellian type, and shows a higher degree of skill in the making. Its shape is more carefully modelled, being finished with a series of little chippings round the edge such as are not found in the earlier implements.

The next stage is the MOUSTERIAN, so called from the cave of Le Moustier, in Dordogne, already referred to (p. 42). The climate was now very cold, the hippopotamus and the southern fauna had altogether

disappeared; the typical animal was the thick-coated mammoth, hence this stage is called the AGE OF THE MAMMOTH. Mousterian implements are quite distinct from those that precede them. Instead of being made out of the core they are made of the flakes, worked on one face only (see Fig. 13). This produces an excellent cutting edge, and it is not surprising to find that imple-

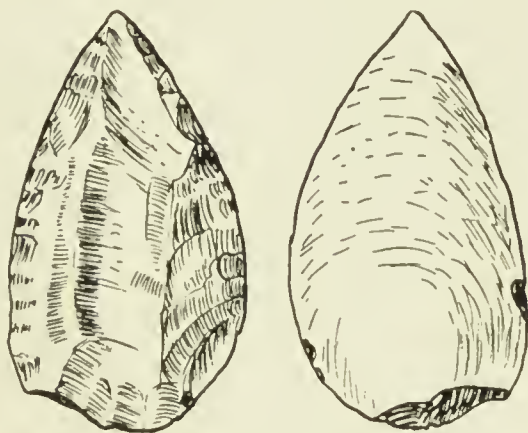


FIG. 13. Mousterian implement, front and back, worked on one face only.

ments of this type were preserved in many of the successive stages. Characteristic also of this time is the scraper (Fig. 14), used doubtless, as by the Eskimo of the present day, for scraping skins for clothing. Greater variety is now found among the implements, and there are indications that bones of the bison and horse were used as tools, and shaped for the purpose.

The climate gradually changed, and the *damp cold* gave place to *dry cold*. The typical animal was the reindeer, hence the last three stages of Palæolithic culture are called the REINDEER AGE. These three stages are the AURIGNACIAN, from Aurignac (Haute-Garonne), the SOLUTRIAN, from Solutré (Saône-et-Loire),

and the MAGDALENIAN, from La Madeleine, in the commune of Tursac, Dordogne (see map, p. 41).

At Aurignac were found numerous objects of bone and abundant implements of Mousterian type together with many new varieties. The most typical implement is the "keeled scraper," illustrated in Fig. 15, occurring at this stage and nowhere else. Implements of the Aurignacian type were found with the skeleton of the



FIG. 14. Mousterian scraper, front and back, worked on one face only.

man at Combe Capelle, hence he is often termed Aurignacian Man (p. 49). At this stage also we meet with the first gravers, whose use is so abundantly shown during the later stages of the Reindeer Age.

Solutré furnishes some of the most beautiful stone implements ever made by Man, whose skill, dexterity, and artistic intelligence had now reached a high level. These are the "laurel-leaf" or "bay-leaf" lance- or dagger-heads delicately chipped on both faces, seen in Fig. 16.

And now we come to one of the greatest puzzles concerning Primeval Man. At Aurignac were found the first graving tools; at Solutré a few engraved and carved bones. At La Madeleine we meet with abundant

evidence of an extraordinarily well-developed sense of art. There are engravings on stone, on bone, on reindeer-antler, and on ivory, carvings in the round, objects of known and of unknown use, decorated with an artistic skill that has seldom, if ever, been surpassed. Primeval Man was a savage, living in a stage of culture

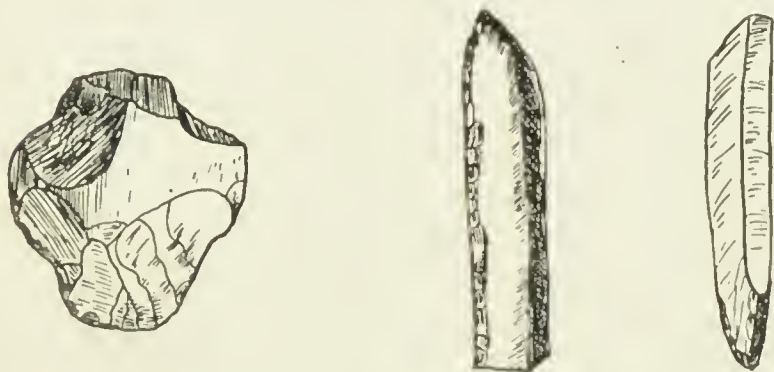


FIG. 15. Aurignacian implements: keeled scraper, flake, and graver.

inferior to that of any savages of the present day. Yet none of these possesses, except in a very rudimentary degree, that remarkable skill in art in which he excelled.¹ This artistic sense was not confined to one neighbourhood, so cannot be attributed to a single genius or even to a small group. The caves of various departments of France, besides many stations in Switzerland, Germany, Austria-Hungary, and Spain, all testify to the spread of artistic talent, and one example, a carving of a horse's head, has even been found in Britain.

With the Magdalenian stage we reach the end of

¹ The nearest approach to the artistic excellence of the Magdalenian period is found in the prehistoric Bushman paintings, which are curiously like the paintings in the Altamira caves near Santander, in North Spain.

the Palæolithic period. Tools of stone and of bone were now very numerous and very varied. Bone dart-heads



FIG. 16. Solutrian lance-
or dagger-head.

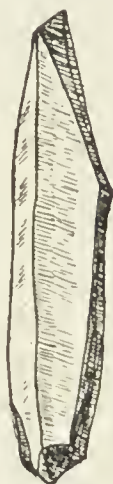


FIG. 17. Magdalenian implements :
flint graver, harpoon of rein-
deer antler, and bone needle.

and arrow-heads, barbed harpoons, and fine bone needles are typical of this final stage (see Fig. 17).

PALÆOLITHIC IMPLEMENTS IN BRITAIN

Palæolithic implements had doubtless been found and preserved in Britain long before their human character was recognised. The first recorded discovery

is that of the "British weapon," now in the British Museum, found at the end of the seventeenth century, together with an elephant's tooth, on what was formerly the bank of the Thames, "opposite to black Mary's, near Grayes Inn Lane." Still many years were to pass, embittered with many discussions, before the enormous antiquity of Man was conceded. Until quite recently the belief that Man was in existence before 4004 B.C. was regarded as contrary to revealed religion, and a menace to the Christian faith. All objects of unknown date were referred to the Romans, or to the ancient Britons whom the Romans conquered, and the bones of extinct animals were conjectured to have been imported from foreign lands by the Britons, or to have escaped from prehistoric menageries. There is no need to dwell upon this period of wild speculation. About the middle of the eighteenth century the evidence became too clear to be disregarded. The kitchen middens¹ and other prehistoric remains of Denmark gave proof of immeasurably long successive stages of stone, bronze, and iron, and the caves explored in Germany, France, and England, as well as the later lake dwellings of Switzerland, all combined to show that Man must have been living on the earth very many thousands of years ago, at a time so remote that the climate was altogether different from that of the present day, and the fauna of modern times had scarcely come into existence. Conclusive proof was afforded by the exploration of the Brixham Cave in 1858. Here, in a careful examination made by experts, thirty-six rude flint implements were found, together with the remains of the hyena, cave, brown, and grizzly bear, woolly rhinoceros, and mammoth, in

¹ See Note 10, Appendix.

undisturbed loam beneath a layer of stalagmite. From that date the contemporary existence of Man and the Pleistocene fauna could not be denied.

The orderly succession of culture stages in tool-making, which is clearly defined in France, has not yet been recognised in Britain, and many English archæologists prefer to divide the implements of the Palæolithic period into River-drift implements and Cave implements, the former being generally the older. Chellian, Acheulian, and Mousterian types occur both in river-drift and in caverns, while it is not yet possible to assign Aurignacian, Solutrian, and Magdalenian types to successive periods of occupation.

RIVER-DRIFT IMPLEMENTS. The course of a river very seldom remains the same for any length of time. The water is constantly at work excavating its bed and washing away its banks. At flood-times great changes occur. The whole channel may be scoured out, thus lowering the water-level, whilst banks of silt are piled up and a new route has to be adopted. And as a river cuts deeper and deeper into the valley through which it carves its way, the river-gravels are left as terraces on either side to mark the earlier levels. Of these the highest terraces are of course the oldest, and in these various types of Palæolithic implements have been discovered. These all occurred in the south of Britain, their northern boundary being a line drawn from the Wash to the Bristol Channel. Isolated implements have been found in Warwickshire and at Lincoln, and will probably be discovered elsewhere.

The river-gravels of the Ouse and the Thames have yielded a great number of Palæolithic implements. One of the most interesting settlements yet discovered is that of Caddington, about two miles from the

River Lea, near Luton, in Bedfordshire, explored by Worthington Smith.¹ Here, according to the discoverer, Primeval Man lived by the side of a fresh-water lake, and manufactured his implements upon the spot which afterwards, by successive floodings, became buried beneath accumulations of mud. There is no doubt that we have here the site of a Palæolithic workshop, for heaps of raw material, hundreds of rough flakes and finished implements, cores and hammer-stones, are found practically as they were left thousands of years ago. Many of the flakes could be fitted on to their original positions, and in one case all that was missing was the central core, which had doubtless been fashioned into an implement.

CAVE IMPLEMENTS. It is suggested that as the climate grew colder (between the Chellian and Mousterian stages in France) Man left his settlements on the banks of the rivers, and sought better shelter in the caves; but it would be difficult to prove that there was any period in the history of Man when he was not a cave-dweller. Some caves were undoubtedly inhabited from the very earliest times, and they continued to be occupied until long after the Palæolithic Age had passed away; indeed, even in civilised countries caves often furnish homes for Man at the present day.

Occasionally we can trace in cave deposits the successive stages of occupation from the earliest ages down to historic times.

In the caves of Creswell Crags, on the north-east borders of Derbyshire, the lowest layers of the cave floor contain bones and very rude flint and quartzite implements, similar to those found in the river-drift; above these come implements of a higher type, made

¹ Cf. *Man, the Primeval Savage*, by W. G. Smith.

of flint transported from elsewhere, and showing an excellence of workmanship like that seen at Solutré. The discovery of a bone engraved with the head of a horse (see p. 65), as well as a number of implements of bone and antler, connect this culture grade with that of La Madeleine.

Two of the most famous of the British caves are the Brixham Cave, already mentioned, and Kent's Cavern, Torquay. The latter shows very clearly three successive stages of occupation.

The lowest layer consists of breccia,¹ containing rude, massive, rather irregular implements of the Chellian type. This was sealed down under a deposit of stalagmite, sometimes ten to twelve feet thick, indicating an interval of great length between the first and second occupation.

In the next layer, consisting of cave earth, were numerous implements showing a higher stage of workmanship; these included a scraper made from a flint flake of Mousterian type, lance-shaped implements which may be compared to those of Solutré, and bone needles and other objects like those typical of La Madeleine (*cf.* Figs. 16, 17).

On this floor there was a black layer consisting of pieces of charred wood, the remains of innumerable prehistoric fires. This second period of occupation is also sealed up under a layer of stalagmite.

At the base of the third and most recent period is a deposit of black mould formed by decayed leaves and other vegetable matter. The earliest remains on this floor belong to the bronze period; above come frag-

¹ *Breccia*, an Italian word meaning gravel or rubbish (connected with the English verb "to break"). In geology it is applied to a rock composed of angular fragments of stone, &c., cemented together.

ments of pottery and other objects of early British and Romano-British times; more recent still are fragments of glazed earthenware dating from the Middle Ages.

The three prehistoric periods of occupation can be dated not only by the artifacts, but also by the contemporary fauna. The only animal remains in the lowest deposits of the cave were those of bears, which were very abundant. In the second stage some extinct as well as existing species were found: the cave hyena, horse, and rhinoceros were the most frequent; the Irish deer, bison, cave, brown, and grizzly bear also occurred, and, rarely, the sabre-toothed tiger. In the latest period were found, together with bones of Man, those of the dog, fox, badger, brown bear, goat, pig, hare, seal, and sheep, the last being the most plentiful.

LIFE OF PRIMEVAL MAN

By combining the evidence derived from the discoveries of the implements, the settlements, and the bones of Primeval Man, we are able to realise to some extent the manner of man he was and the kind of life he led.

In the earlier stages of the Palæolithic period, when the climate was warm and damp and Man and the hippopotamus lived together in Western Europe, his existence was probably much like that of savages in semi-tropical lands to-day. Small groups or companies wandered over the fertile country, which in the favouring climate produced abundant vegetation. On the shores of the immense rivers, whose banks were thickly clothed with dense forests, our ancestors found abundant provision for their daily needs. Their time

was spent mainly in collecting food, in hunting and in fishing, though they had no idea of cultivating plants, no dog to help in the pursuit of game, and the earliest harpoons do not appear until the end of the Palæolithic Age. In these respects Primeval Man was inferior in equipment to any known savages of the present day; he was probably inferior also in bodily structure and in mental endowment, though of this we can show no absolute proof. If he made temporary shelters of boughs and leaves time has obliterated all evidence, and no trace is left of the wooden clubs he no doubt possessed, or of the spears and javelins of wood, perhaps with points hardened in the fire, such as are found among the most primitive peoples. The bow and arrow had not yet been invented,¹ though, doubtless, Man was expert, as are all hunting peoples, in making snares and laying traps for game.

HABITATIONS

We may seek for examples of the habitations of Primeval Man among the Bushmen of South Africa. A cave with its opening protected by a few branches, or the centre of a small circle of thorn trees round which the skins of animals were stretched, were the best dwelling-places they aspired to possess. If neither of these was within their reach they scooped out a hole in the ground, placed a few sticks or stones round

¹ Some of the smaller flint points of the Reindeer Age may be arrow-heads, and a painting on the wall of a recently discovered prehistoric rock shelter in Spain certainly represents an archer with bow and arrows (see Breuil and Aguiló, *L'Anthropologie*, 1911, p. 641). From the style of the painting it is probably of late Palæolithic date.

it, and spread a skin above to serve as a roof. A little grass at the bottom of the hole formed the bed.¹

FOOD

As regards the prime occupation, the search for food, our imagination is apt to lead us astray in picturing Man as constantly at war with the larger beasts, hunting, slaying, and eating the mammoth or the bison. Though the bones of the large animals often show traces of having been cracked to extract the marrow (usually accepted as a sign of Man's handiwork), the daily supplies were probably of a far humbler nature. Worthington Smith² has drawn up a list of the fare of the primeval savage.

He was both herbivorous and carnivorous. He had for food hazel-nuts, beech-nuts, sweet chestnuts, earth-nuts, and acorns. He had crab-apples, wild pears, wild cherries, wild gooseberries, bullaces (wild plums), sorbs (mountain ash), sloes, blackberries, yew-berries, hips and haws, watercress, fungi, large soft leaf-buds, nostoc (the vegetable called "fallen stars" by country folk), the fleshy underground stem of various plants, and other delicacies of the vegetable kingdom. He had birds' eggs, honey and honeycomb of wild bees. He had snails, newts and frogs, fish and fresh-water mussels, besides grubs and insects, larvæ of beetles and various caterpillars.

Having succeeded in his quest for food, we can picture Man devoting some of his leisure to the manufacture of flint implements. In the earliest stages of

¹ G. M. Theal, *History and Ethnography of Africa*, vol. i., 1907, p. 10.

² *Man, the Primeval Savage*.

human development each man probably fashioned his own weapons, but from the discoveries at Caddington¹ and elsewhere we know that Palæolithic workshops existed from an early date, implying division of labour, social advance, and perhaps the beginnings of trade or barter.

Towards the end of the Palæolithic period advance

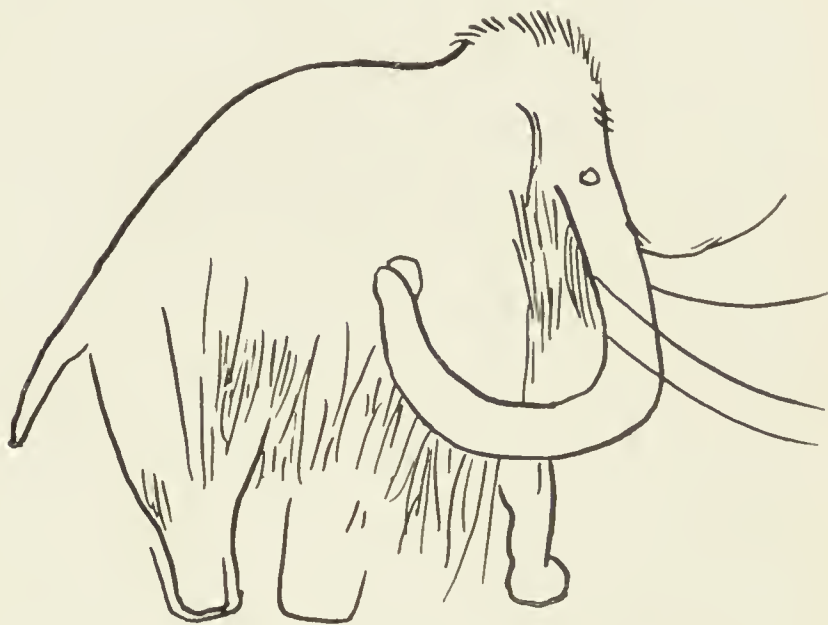


FIG. 18. Mammoth, engraved by Primeval Man in the Grotte des Combarelles (Dordogne).

had been made in various directions. The coldness of the climate had perhaps driven Man from his open-air settlements on the banks of rivers to seek the warmth and shelter of the rocks and caves. He was still a wandering hunter, but his weapons were far more varied, and the excellence of their manufacture in flint and other stones, bone, antler, and ivory shows a highly developed handicraft.

¹ See p. 68.

CLOTHING AND ORNAMENTS

The Mousterian scrapers suggest that clothing was made of skins, and the bone needles of La Madeleine were doubtless used for sewing the skins together with threads of sinew. All traces of clothing have vanished, but we have some hints as to the decorations and ornaments of Primeval Man. There are very few savages who do not decorate their bodies with paintings, tattoo-

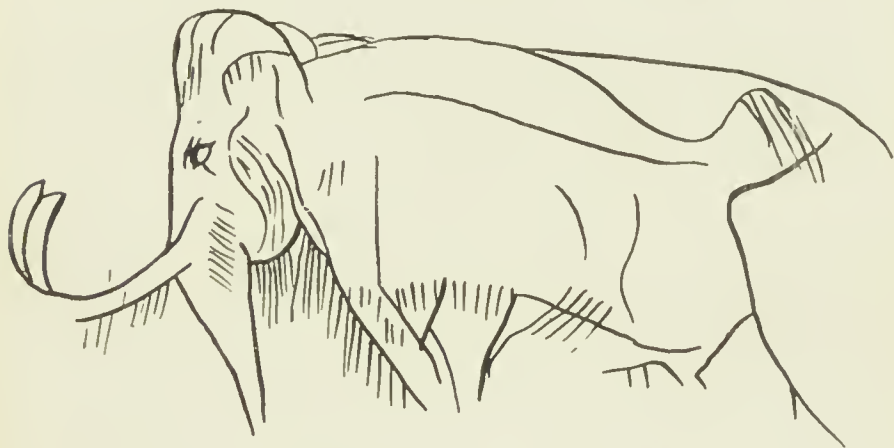


FIG. 19. Sketch of a mammoth in La Madeleine Cave (Dordogne).

ings, or scarifyings of various patterns. That Primeval Man adorned his person with the addition of paint is indicated by the remains of the colouring matter found abundantly throughout the Reindeer Age. Red, yellow, and black powders are common, occurring together with the hollow blocks and curved pebbles used to grind them down. These colours were the same as those with which the walls were painted, and also doubtless served for personal decoration, while in many instances the bodies of the dead were completely covered with red powder for burial. Some small pointed flints of

Magdalenian Age found in Dordogne are similar to those used for tattooing, and may have been employed for the same purpose.

The next stage in the decoration of the body surface is the addition of ornaments. These consist of strings of perforated shells and teeth, worn as bracelets, necklets, head-dresses, and girdles. More than two hundred little shells formed the head-dress of one of the men buried in the Grimaldi caves (p. 52), and the collar and girdle of a skeleton in the Duruthy cave were adorned with the perforated teeth of the bear and lion. As is usual among savages, the men wore more decorations than the women.

ARTS OF LIFE

The art of Primeval Man has already been noted (p. 64). The style is always realistic, the subjects being mainly animals, sketched in profile. The mammoth (see Figs. 18, 19), reindeer, horse, urus (aurochs¹), bison, rhinoceros, and other animals are represented, sometimes with wonderful fidelity, but the few engravings of human beings are drawn with a far less certain touch. Statuettes of female figures of an archaic type are not uncommon in the earlier periods. We cannot expect to find much material evidence of the almost universal arts of music and dancing, but traces have been recognised here and there. Certain tubes, made of the hollow bones of birds and animals, perforated with holes, are probably the remains of primitive flutes, and some curious wall-paintings in the caves of Altamira have been thought to represent human beings engaged in a magical dance.

¹ See Note 11, Appendix.

CHAPTER IV

Transition from Palæolithic to Neolithic Age : Geography : Climate : Fauna : Chronological divisions fail. Neolithic Man in Britain : Relationship between Palæolithic and Neolithic Man : Transition period in France—Mas d’Azil, Oban. Neolithic implements : Hafting. Neolithic monuments — Long barrows, Megaliths

TRANSITION FROM PALÆOLITHIC TO NEOLITHIC AGE

THE Stone Age has been divided (as was seen on p. 30) into the Palæolithic or Old Stone Age, and the Neolithic or New Stone Age, but there is no clear boundary line separating the two. Transition stages have been identified, especially in France, which show how the earlier and later cultures overlap, and Man gradually advanced from one grade to the other. This transition has also been recognised in Britain, but it is in Britain that the most direct contrast between the two eras is seen.

Except for the fragmentary remains mentioned on pp. 36–8, Palæolithic Man¹ in Britain is represented merely by his implements of stone, of antler, or of bone, found associated with remains of extinct animals in river-gravels or caves. These are the only traces of

¹ The terms “Palæolithic Man” and “Neolithic Man” are convenient abbreviations of the more accurate phrases, “Man in the Palæolithic (or Neolithic) stage of culture.” But *cf.* Note 3, Appendix.

human existence in Palæolithic times which have survived the ages, and they are confined to a small area in the south of England.

It is very different with Neolithic Man, for he has left abundant evidence of his occupation of the land from Kent to Cornwall, Wales, and Ireland, and from Shetland to the Isle of Wight, while his descendants are still living in the regions of which he took possession many thousands of years ago. We find the houses of the living and the tombs of the dead, the mines where flints were quarried, and the camps and earthworks for defence or retreat. We can trace Man's progress in agriculture, and the domestication of animals, his advance in the arts of pottery and tool-making, basketry and weaving, and gain some idea of the life he led, the food he ate, and even the clothes he wore.

The main distinctions that divide the Neolithic from the Palæolithic Age (besides the culture, which is dealt with later) are those of geography, climate, and fauna.

GEOGRAPHY

Vast earth movements gradually altered the face of Western Europe; Great Britain no longer formed part of the mainland, and by the sinking of the Mediterranean basin Europe was cut off from the African continent. There has been a considerable alteration both in the coast-line and in the surface of Britain since the advent of Neolithic Man, for he has left his traces in the forests now sunk beneath the Bristol Channel, and his dug-out canoes in the basin of the Clyde more than twenty feet above high-water mark. The Carse of Stirling affords one of the most

instructive examples not only of the great changes that have taken place on the surface of the country, but of the vast length of time that these changes must represent. When Man was living near this district in Neolithic times, the estuary of the Forth ran up to Falkirk and whales were stranded in the slimy mud of the inland sea not far from Stirling. With their skeletons are found the deer-horn implements with which the Neolithic hunters cut up the carcasses for flesh and blubber. The gradual rising of the land above sea-level was followed by a growth of primeval forest, whose enormous tree-trunks are found embedded in the peat by which it was ultimately covered. It is only in the last few centuries that the land has been cleared and drained and devoted to agriculture. The succession of sea, forest, peat-bog, and cornfields gives us some idea of the vastness of time that separates us from our Neolithic ancestors.¹

CLIMATE

It is probable that the dry cold that characterised the greater part of the Reindeer Age was already modifying in the Magdalenian stage, for the reindeer was giving place to the deer and seeking a more congenial climate farther north. At the beginning of the Neolithic Age the general conditions seem to have been much the same as at the present day.

FAUNA

As regards animal life in Britain, with the exception of the giant deer, the aurochs, and the bison,² which

¹ Cf. R. Munro, *Prehistoric Scotland*, pp. 57 ff.

² See Note 11, Appendix.

survived into the Bronze Age, the great beasts of earlier times had disappeared. The mammoth had become extinct; the reindeer had retreated to the north; the caves were still occupied by bears, which were not exterminated until after the advent of the Saxons, while wolves and wild boars were hunted in the forests down to the seventeenth century. The beaver was common in Britain until the Norman Conquest.

The ox, sheep, goat, horse, and dog were, as will be seen later, newcomers during the Neolithic period.

CHRONOLOGICAL DIVISIONS FAIL

Man's slow advance in culture through the Palæolithic Age made it possible to divide the period into definite stages, named after typical sites, but no such method of dividing up the Neolithic Age has yet been discovered, though it contains many distinct types of culture, some general and some local.

In certain districts Neolithic Man buried his dead under huge mounds of earth, called barrows;² many of the barrows contain a chamber or tomb built of large unshaped stones set on end and supporting roofing stones; elsewhere similar structures of huge unwrought stones are open to the air. These three types of burial, the long barrow, the chambered barrow, and

¹ The reindeer is said to have been still hunted by the Orkney jarls in the twelfth century in Caithness.

² Barrow. Old English, *beorg* = mountain. The barrows during the greater part of the Neolithic period are longer than their breadth, and so are called Long Barrows, to distinguish them from the Round Barrows of the later Neolithic and the Bronze Age.

the dolmen or cromlech,¹ are all found in Wiltshire, and the same county also contains three of the most impressive prehistoric monuments in Britain, Silbury Hill, Avebury, and Stonehenge.² The homes of the living show no less diversity than the dwelling-places of the dead. In some parts Man still occupied the



FIG. 20. Stonehenge, on Salisbury Plain.

caves like his ancestors; in others the remains of pit dwellings or hut circles show evidence of his house-building; and still another form of settlement, characteristic of Neolithic culture in Switzerland, though later in Britain, is seen in the pile dwellings and crannogs.

It will be best, therefore, to treat these different groups separately. We will glance first at the physical type of Man in the Neolithic Age, then see what evidence can be derived from his implements, structures, and other remains, and, in the final chapter, attempt a description of his manner of life.

¹ See Note 12, Appendix.

² See below, pp. 95 ff.

NEOLITHIC MAN IN BRITAIN

In spite of this diversity in culture, one fact seems clear. The builders of the long barrows, of the chambered barrows, and of the rude stone monuments were all of the same physical type, and all belonged to the same race.¹ This race spread all round the shores of the Mediterranean, and found its way across to Britain through Spain and France in prehistoric times, and from its distribution it is called the Mediterranean Race. Its general characters comprise a long, narrow head, with an oval face and narrow nose, dark complexion, dark hair and eyes, and a stature of about five and a half feet. These are the characteristics of the race at the present day, as can be seen in the people of Spain and of parts of France, and we are familiar with the type in Britain, especially in Wales and the south-west of England.

Before the end of the Neolithic Age another race was penetrating into Britain. The earlier population is often called, from the shape of their burial-mounds, the Long Barrow Race, and, since the newcomers erected circular mounds, they are distinguished as the Round Barrow Race.² These differed from the Mediterranean Race in many important particulars. They were taller, averaging five feet nine inches in height, with strong, muscular frames; the face was massive, often with rugged outlines, prominent brow-ridges, heavy jaws, and projecting cheek-bones. But the greatest contrast lies in the head-form, which is usually

¹ See Note 13, Appendix.

² These may be regarded as racially mixed forerunners of the round-headed Alpine Race which forms the majority of the present populations of Central Europe.

chosen by anthropologists as one of the most important of all the features distinguishing one race from another.

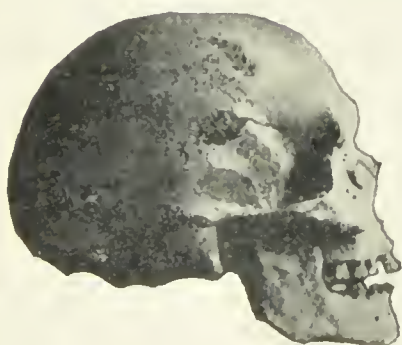
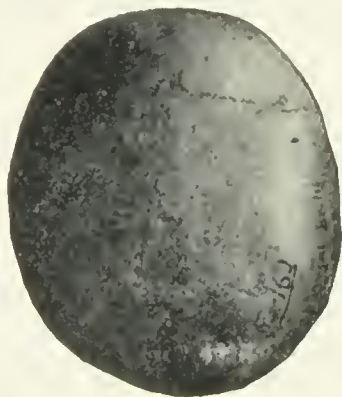
A*B*

FIG. 21. A. Typical Long Barrow skull, viewed from above and in profile. Neolithic Age.

B. Typical Round Barrow skull. Bronze Age.

(From *The Study of Man*, with the permission of Dr. A. C. Haddon.)

For while the skulls of the Mediterranean Race, when viewed from above, are long and narrow, those of the round barrows are more circular in shape. Hence the

convenient formula: long barrow, long skull; round barrow, round skull (see Fig. 21).

RELATIONSHIP BETWEEN PALÆOLITHIC AND NEOLITHIC MAN

It is impossible to say whether any of the Neolithic people, commonly called the Mediterranean Race, were the direct descendants of the earlier occupants of Western Europe in Palæolithic times. In many parts the break between the two cultures is so marked that they have been believed to be absolutely distinct, and it was supposed that Man of the Reindeer Age, with whom we were dealing in the last chapter, had disappeared long before the succeeding race took possession of the land. But gradually the gap between the Palæolithic and Neolithic stages is being filled in, and it is recognised that the transition from the one culture grade to the other may have been slowly accomplished as a natural process of evolution, without any displacement of the population.

The many uncertainties and discussions with regard to the age of certain interments (such, for example, as those of Cro-Magnon and Grimaldi) make it clear that there can be no very marked distinction between the burial customs of Palæolithic and Neolithic times; it is only by means of the objects found with the skeletons that their date can be assuredly fixed. Geological evidence, as we have seen, or remains of extinct animals, give undoubted proof of Palæolithic age. Polished implements or fragments of pottery only appear with Neolithic interments. Should these tests fail, it is impossible to say whether the burial should be classed as late Palæolithic or early Neolithic. In both periods

the dead were buried in caves and rock shelters; the bodies were sometimes outstretched, sometimes placed in a crouching posture; they were decorated with ornaments, and various objects of stone or bone were placed by their side; often, too, the accompaniment of the powders used for face- or body-painting indicate that personal decorations were believed to be as necessary in the next world as in this. The presence of a number of bodies in one grave is characteristic, as we shall see, of the Neolithic period, but already in the Palæolithic Age more than twenty skeletons were found interred together at Predmost, in Moravia,¹ and several burials were associated, together in the Grimaldi caves. From the position in which the bones of the skeletons are found, it is often suggested that the bodies had been dismembered before burial; perhaps they were left to decay naturally before interment, which custom is found among savages at the present day. The same disarrangement of bones occurs both in Palæolithic and in Neolithic times. There is no doubt, therefore, that the burial customs continued unbroken from the earlier to the later culture, and this indicates that, in certain areas at least, there was no great gap between the two.

TRANSITION PERIOD IN FRANCE

The most abundant evidence for the period of transition is to be seen in France, where certain settlements show characteristics of both stages of culture, and others contain features which cannot certainly be referred to either.

The Cro-Magnon deposit has already been noted as of doubtfully transitional age (p. 51, *n.* 2), but no

¹ See Note 7, Appendix.

unquestionable Neolithic object was found with the skeletons. The implements of the open-air settlement at Solutré, though usually accepted as Palæolithic, on account of the presence of the mammoth, cave bear, and other extinct animals, are undoubtedly of a Neolithic type, and show a striking resemblance to Neolithic implements from Ireland.

The caves of Baumes Chaudes, near Saint-Georges-de-Lévêjac, in Lozère, appear to have been used as a family sepulchre down to the beginning of the Bronze Age, no less than three hundred skeletons having been identified. In one of the caves there were only chipped flints and a few rude implements of antler. In the other there were a few arrow-points (of Neolithic type), a bead, and some deer-antler tools, suggesting an advance in culture. Another of these family vaults was discovered in the commune of Saint-Pierre-des-Tripiers, also in Lozère. Here in the cavern of L'Homme Mort were the remains of about fifty skeletons of both sexes and all ages, together with a few polished flint implements, including an arrow-head and fragments of coarse pottery. Nineteen of the skulls were complete enough to be measured, and all save two resembled those of Cro-Magnon.

MAS D'AZIL

A yet more definite stage of transition was recognised at Mas d'Azil, in the department of Ariège. The cave consists of underground galleries more than four hundred yards long, which tunnel under the river Arise. These shelters were evidently occupied at various epochs from Palæolithic to modern times, and two layers of human habitation occur between typical relics of the

Reindeer Age and the earliest characteristic Neolithic deposit. In successive floors it is seen that the deer gradually becomes more frequent, and the reindeer rarer, until it disappears; the Magdalenian flint implements are supplemented by new varieties, and, owing to the disappearance of the reindeer, the antler harpoons are of a different type. But the greatest interest centres

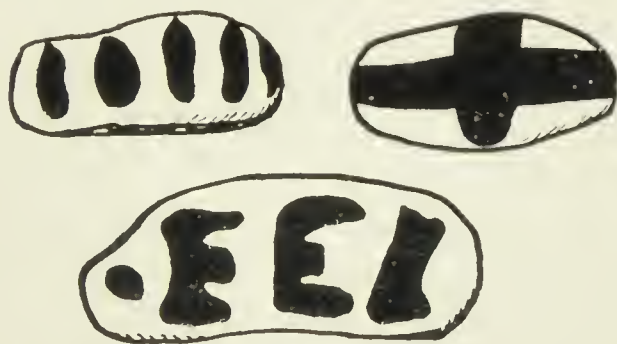


FIG. 22. Coloured pebbles from Mas d'Azil, Ariège, showing curious markings.

round the famous coloured pebbles (see Fig. 22). Some take these to represent the beginnings of a prehistoric alphabet; others regard them as magical signs; others, again, think they belong to a game. Similarly marked pebbles have been found in other parts, but their purpose must for the present remain obscure.

OBAN

This transition stage, often called Azylian from the last-mentioned site, is recognised in Britain in the caves of Oban.¹ These are in the face of the cliff that fronts the bay, now a hundred yards from the beach, and raised

¹ See R. Munro, *Prehistoric Scotland*.

thirty feet above high-water level ; but there is evidence that at the time of their early occupation the opening of one of them (the MacArthur Cave) was on the sea-beach, so close to the sea that the waves could cover the floor with pebbles during a storm. The implements found here include a few flints and hammer-stones, but most are made of antler or of bone, and some deer-antler harpoons, barbed on one side, are strikingly similar to those found at Mas d'Azil. The heaps of shells, bones, and other refuse show that the occupants of the cave lived the same life as that of the Palæolithic hunters ; but the late type of implements and lack of remains of extinct animals on the one hand, and the absence of pottery and other characteristics of Neolithic culture on the other, indicate an intermediate stage of transition between the two.

NEOLITHIC IMPLEMENTS

We have seen that the distinction between the two divisions of the Stone Age was founded on the contrast between the characteristic implements of each period, and for this reason they are often distinguished, especially in France, as the periods of chipped and of polished stone. But there are a great many classes of Neolithic implements, such as knives, scrapers, and arrow-heads, which are rarely, if ever, ground or polished ; and as regards the majority of the ruder tools, the labour of grinding and polishing would only have been waste of time. Nevertheless the tools and weapons of the later age show such a marked advance, both in workmanship and in variety, over those of the earlier period that, as a rule, they are easily distinguished. Man's first idea of a weapon was probably a pointed

stake, with the end perhaps hardened in the fire. Then a harder point was made of antler, bone, or stone. Such weapons are found all over the globe. But the discovery of the destructive power of a pointed stone shot by means of the bow belongs to a higher grade of culture,



FIG. 23. Neolithic arrow-heads (Haddon Collection).

and is still unknown in parts of Australia and Polynesia. It is probable that some of the smaller pointed implements found in French caves of the Reindeer Age were used as arrow-heads,¹ but none appear in Britain before the Neolithic period; from their abundance it would seem that the bow and arrow became the ordinary weapon in Neolithic times, and extraordinary skill is shown in their manufacture (Fig. 23). Another step

¹ See p. 72 *n*.

in advance is the attachment of stone implements to handles. The arrow-heads had to be fitted to shafts, and the heavier implements, such as were used in the hand in earlier times, were now driven into handles made of wood. Some of these handles, in spite of their perishable nature, have been preserved in peat-bogs, and show the methods of hafting in early times. We can follow the whole life-history of a flint tool through the various stages of mining, chipping, grinding, polishing, and hafting, and sometimes even see its final resting-place in human vertebra or bovine skull.

It would scarcely be expected that an industry would be carried on uninterruptedly from the Stone Age to the present day, but such is the case near Brandon, on the borders of Suffolk. In this district Man quarried his flints with deer-antler picks in the dim past, before the knowledge of the use of metal had penetrated to Britain, and here, with picks of the same shape, but made of steel, flints are dug out in primitive fashion to-day. The best flints are found in large lumps several feet below the surface, so shafts are dug, with steps leading down to the galleries worked along the line of the flints. Shafts and galleries can be traced in the disused pits from which the flints were extracted by Neolithic Man, and in the galleries, on whose walls the marks of pick and hammer show as clearly as if made but yesterday, stone hatchets, hammer-stones, numberless red-deer antlers, and rudely made cups, probably used as lamps, indicate the outfit of the Neolithic quarryman. On one of the picks left in place by a workman, many thousands of years ago, the imprint of his fingers could be clearly seen in the chalk sticking to the handle. The flints were evidently worked on the spot, as battered hammer-stones, cores and flakes, and numerous more or less

finished implements, such as axe-heads, scrapers, and borers, are found in the fields around. We have seen the process of chipping (p. 60) by which the implements were made out of the flint nodules, the larger ones being made out of the core, and the smaller, finer ones from the flakes. The axe-heads and larger implements were usually ground and polished, the grindstone being a large flattish slab, sometimes merely a natural rock or boulder fixed in the ground. The process was often assisted by coarse sand, and the implement was rubbed backwards and forwards until all irregularities were ground down. Many of the slabs show a hollow, worn out by constant use.

HAFTING

We have evidence that prehistoric implements were hafted in two ways: one by making a hole in the handle and inserting the tool; the other by making a hole in the tool and inserting the handle.¹ The former method was the common one employed in the Neolithic Age. A thick piece of strong wood was chosen, and a hole, large enough to fit the tool, dug out with a sharp flint knife (Fig. 24). As the force of repeated blows, when the tool was in use, was apt to split the wooden handle, the stone was sometimes first fitted into a socket made of antler, the elasticity of which deadened the force of the blows.

The second method of hafting, *i.e.* by making a hole in the tool and driving a wooden handle through (as with modern axe- or hammer-heads), does not appear early in the Neolithic period, and is rare in Britain before the Bronze Age. This is not surprising when

¹ See Note 14, Appendix.

we think of the vast labour entailed in boring a hole through a hard stone without the aid of metal tools.¹ Nevertheless it was often accomplished. Sometimes the hole was dug or picked out with a sharp flint, but an easier way was to use a drill. A small depression was first hammered out and filled with sand and water,

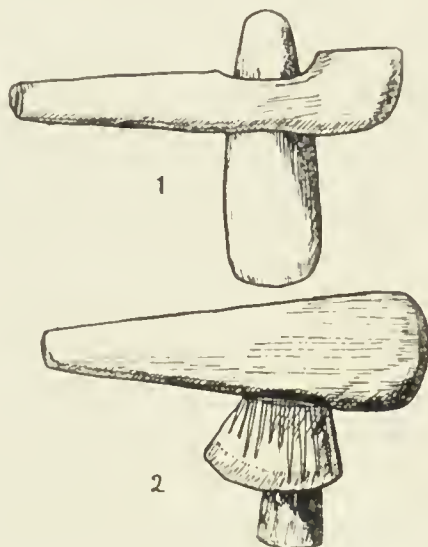


FIG. 24. Hafting.

1. Stone axe-head wedged into hole in wooden handle.
2. Stone fitted into socket of antler, fixed in wooden handle.

and then a stick was made to revolve in the hole, by being twirled between the hands (or perhaps by means of the bow-drill or pump-drill, contrivances used in many parts of the world, Fig. 25), and the sand, becoming embedded in the stick's point, ground out a circular hole in the stone. When a sufficient depth was reached the stone was turned over and the same method employed on the other side. So in many perforated implements the hole has something of the

¹ See Note 15, Appendix.

shape of the letter X, being broad on the upper and lower surfaces, and narrowing in the centre. It seems probable that the finer specimens of holed implements belong to a later age, and were perforated with the help of metal instruments.

To make the arrows, a strong shaft of wood was

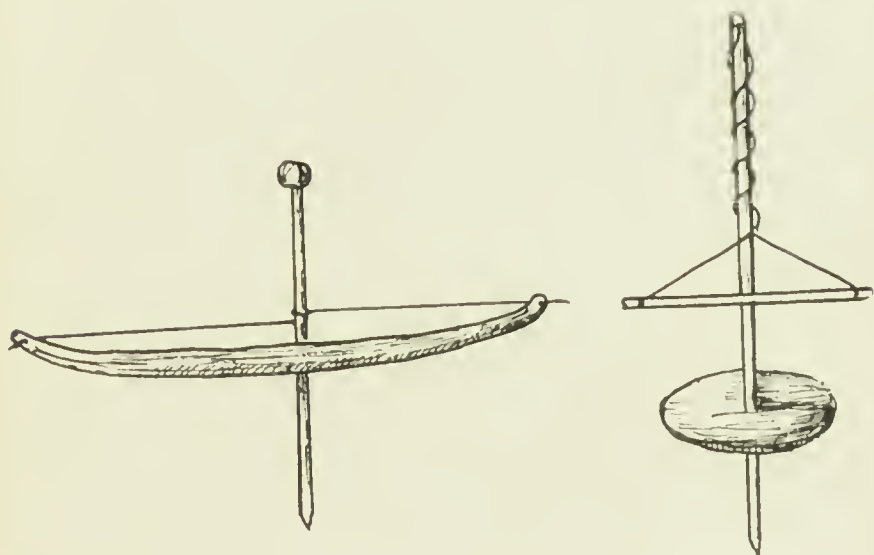


FIG. 25. Bow-drill and pump-drill.

The former is worked from side to side, the latter up and down. They are used for boring (p. 92) and for fire-making (*cf.* p. 55).

taken, and split at the end to receive the base of the arrow-head, which was firmly bound on with gut or sinew; concave scrapers were used to trim the shafts down to the required size and remove irregularities.

Time has not obliterated all trace of the uses to which these implements were put. We can see the marks on the walls of the galleries dug out with stone tools and deer-antler picks in the quarries near Brandon, and we can obtain some idea of the dangerous force of

the sharp flint points when used as weapons, from their discovery deeply embedded in animal or human bones, both in the Palæolithic and Neolithic Ages.

NEOLITHIC MONUMENTS

As far as we can tell, Man in the Palæolithic Age had not learnt how to build. He probably made shelters of boughs when camping in the open, but the wandering hunter has no need of a permanent stone dwelling, and none are found until a pastoral life and the beginnings of agriculture anchored Man to the soil. And even then the houses of the living received far less attention than the resting-places of the dead, for to the Neolithic Age belong some of the most impressive funeral monuments ever erected by Man, ranking justly among the wonders of the world.

On p. 80 the various ways in which the dead were buried in Britain were briefly mentioned, but, since sepulchres usually contain the best evidence we possess of a prehistoric people, it will be well to examine them in more detail.

The funeral customs were by no means uniform. The dead were buried in the earth, without any other protection or covering, and this was probably the common method of burying ordinary people. Where natural caves or rock shelters occurred, these were used as sepulchres, and artificial recesses were sometimes dug out of the softer rocks. The most characteristic and remarkable forms of burial (probably reserved for chiefs and important persons) were those in the long barrows and those associated with megaliths, or stone monuments.

LONG BARROWS

The enormous mounds of earth called Long Barrows were sometimes heaped directly over the burnt or unburnt body, but often a chamber was constructed, composed of large slabs of unwrought stone, set on end, and covered with roofing stones to form a central tomb. This was used as a family vault, and usually contained a number of bodies interred at different times. As the chambered and unchambered barrows seem to belong to the same period, and occur in neighbouring districts, the distinction is possibly merely due to the presence or absence of suitable stone. The most remarkable monument which may be classed with sepulchral mounds is that of Silbury Hill.

Silbury Hill is a gigantic artificial mound, 130 feet high, with its base covering more than five acres of ground, on the Bath road, west of Marlborough. Two excavations have been made without discovering any traces of burial; but, as Mr. J. R. Mortimer remarks: ¹ "It could hardly be expected that these two small openings would be more likely to find the primary grave . . . than two rat-holes would be likely to come upon the ashes of a mouse placed under a mound ten feet in diameter."

MEGALITHS

The rude stone monuments erected in the Neolithic Age are grouped (see Note 12, Appendix) as standing stones (often called menhirs), alignments or avenues, stone circles, and dolmens or cromlechs. The standing

¹ *Forty Years' Researches*, p. xviii n.

stones of Britain, such as the Kingstone on the borders of Warwickshire and many examples in the south-west of England, are easily surpassed by the magnificent stones of Brittany. The menhir of Dol (Ille-et-Vilaine) stands twenty-eight feet above the ground and is buried sixteen feet below, but these dimensions were far exceeded by the famous Stone of the Fairy at Locmariaquer (Morbihan), which was sixty-four feet high. Unfortunately, it was long ago shattered by a stroke of lightning, and now lies in pieces on the ground.

Avenues are not uncommon on Dartmoor, and are often associated with stone circles, as at Stanton Drew, Callernish, Avebury, and Stonehenge, but Brittany again possesses the most famous examples. At Carnac (Morbihan) there are three series of alignments, consisting of ten or more parallel rows of hundreds of stones, some over eighteen feet high. But if France stands easily first in examples of menhirs and alignments, Britain possesses the finest stone circles in the world, and the impressive magnitude of the ruins still affects the beholder with a sense of the religious awe with which their builders were inspired.

The stone circles at Avebury (Fig. 26), between Marlborough and Calne, must, when perfect, have been a magnificent sight. The line of the outer circle, which encloses two smaller circles, can be traced by means of the enormous earthwork, about seventy feet high, which surrounds it; it is nearly a mile in circumference, and covers twenty-eight acres. Only a very few stones remain of the two or three hundred of the original plan; some huge blocks over twelve feet high are still standing; some are prostrate; some are buried; the greater number (estimated at five-sixths) have been destroyed, mainly for building purposes. The stones

of Callernish (see Frontispiece) have alignments stretching out in the form of a cross. The lighter colouring on the lower portion of the stones shows how deeply they were buried in the peat before their recent excavation.

The vault of the chambered barrow consists, as we



FIG. 26. Remains of the stone circles at Avebury, Wiltshire.

have seen, of upright slabs of unwrought stone, capped by roofing stones. The dolmens or cromlechs show the same construction, but stand open to the sky (see Fig. 27). It is known that some of these were originally covered under a mound of earth, thus forming chambered barrows, but all traces of the earth and of the interments which it doubtless contained have long since disappeared. The usual form is that of three huge stones, set on end, supporting a cap-

stone which may weigh, as in the case of that at Ballymascanlan, Co. Louth, as much as sixty tons. Some are so small that a man can scarcely crouch



FIG. 27. Dolmen or cromlech, "The Spinsters' Rock,"
Drewsteignton, Devon.

beneath them, and others will shelter a group of horsemen. They occur in various parts of Britain, and are especially abundant in Cornwall, Wales, and Ireland. They are also found in France, Denmark, Sweden, and North Germany, and all round the Mediterranean shores. In India and Madagascar

similar constructions are erected at the present day.

The meaning of the megalithic monuments has been much discussed, and various speculations have been made as to their origin and purpose. They have been called religious monuments, solar temples, Druidical temples,¹ places of sacrifice, of political or judicial assembly, triumphal or commemorative monuments, or sepulchres. It is unlikely that all were erected from exactly the same motive, and it is possible that at different times they were used for various purposes; but wherever any evidence is forthcoming, either in the monuments themselves or in later or in existing customs, it points to a connection with the commemoration of the dead. Since the worship, or the fear, or the pacification of the dead forms the basis of almost all primitive religion, it seems unquestionable that these monuments bear witness of the religious life of our ancestors.

¹ Popular belief generally attributes the megaliths to the Druids, but the connection is absolutely unsupported by evidence, and the idea is of recent (eighteenth-century) origin.

CHAPTER V

Neolithic habitations—pit dwellings, pile dwellings, crannogs : Domestic animals : Agriculture : Primitive industries—basketry, pottery, textiles : Clothes and ornaments. General survey of the Stone Age. Religion

NEOLITHIC HABITATIONS

THE domestication of animals and the beginnings of agriculture, of which we shall speak later, are almost always accompanied by a great change in Man's mode of life. The wandering hunter who has hitherto migrated with the game from place to place, sheltering in natural caves or under rude structures of branches, now makes a settled home, and remains of some of his homesteads are to be traced at the present day.

PIT DWELLINGS

The most characteristic form in the Neolithic Age was the pit dwelling. A circular pit, a lowly form of which is found among the Bushmen (*see* p. 72), was dug in the ground, usually about six feet, but sometimes even thirty feet, in diameter, and two to six feet deep; the sloping roof was formed of wattle and daub—that is, of stakes or branches (often of willow) caked with clay. Sometimes by the side of the larger pit, which was evidently the family dwelling-place, a small

pit is found, probably used as a storehouse or as a cooking pit; often a number of pits, large and small, are enclosed within an earthen rampart. In some of these rude dwelling-places human occupation can be traced through long periods of time, in spite of great changes in culture and advance in civilisation. Among the lowest layers of refuse occur flint implements, worked bones, and fragments of coarse pottery; later come weapons and ornaments characteristic of the Bronze Age; while the presence of iron tools, Roman coins, and Samian ware¹ show that the pits were still used down to a very late date. There is no doubt that Britain lagged very far behind the mainland in house-building. Long before the first traces of metal had appeared a far higher type of house was being built on the Continent. At Grossgartach, Württemberg, to the east of Heilbronn, a Neolithic village has been discovered, consisting of a cluster of pit dwellings. But these show a distinct advance in several particulars. The huts were rectangular, instead of round. In place of possessing only one room, with an occasional addition of a separate storeroom or cooking place, the square living-room had a raised bank partitioned off as a sleeping chamber. The walls were built of wooden stakes, with a lattice-work of branches; two coats of clay stiffened with chopped straw formed the inner and outer surfaces of the walls, and the inner one was decorated with paintings in colour in straight-line designs. The square shape, the division into separate rooms, and the coloured rough-cast walls show an advanced stage of culture such as has not yet been

¹ Samian is the name given to fine red pottery found on Roman sites, from a supposed connection with the island of Samos.

attained in many parts of the British Isles, yet no trace of metal was found in the village, and all the evidence proves it to be of purely Neolithic date.

PILE DWELLINGS

Another type of settlement which was common in the Neolithic Age on the Continent, but of which only a few traces occur in Britain before the Bronze Age, is that of the pile dwellings, built over the water on the shores of lakes. These have been carefully explored and have yielded abundant evidence of the life led by Neolithic Man; it must be remembered, however, that they represent a stage of culture which was not attained in Britain until after the introduction of metals.

The situation was advantageous for many reasons, but chiefly for the protection it afforded against attack by man or beast, and for the conveniences of fishing. Herodotus relates of the lake-dwellers of his time that owing to the abundance of fish a man had but to let down an empty basket by a cord into the water, and after a short time he drew it up again full of fish. Pile dwellings are still inhabited in many parts of the world, on the estuaries of the Amazon and the Orinoco, on the sea-shores of New Guinea (see Fig. 28) and Borneo, and occasionally on the shores of the lakes of Central Africa. In Neolithic times they were numerous in Switzerland, parts of Italy, France, and Germany, and structures of a somewhat different type, belonging to the end of the Neolithic period, are found on lake borders in Ireland and Scotland.

The plan of the construction was not uniform, but varied with the position. Usually a cluster of huts was erected on a platform supported on piles over the

shallow waters at the edge of a lake, and the settlement was connected by means of a wooden gangway with the shore. The piles were whole tree-trunks, their ends trimmed by fire or chopped with the axe. The plat-



FIG. 28. Pile dwellings, Kaile, New Guinea.

form was of whole or of split logs, fastened by means of wooden pins. No metal is anywhere found in the construction.

The houses were sometimes circular, sometimes rectangular, built of wattle and daub, with clay floors and stone hearths. The roofs were probably thatched with bark, straw, reeds, or rushes. Sometimes it appears that no gangway was provided, and the only means of communication was by boat. Fig. 30 shows the out-

lines of a boat found buried in the peat at Robenhausen, Switzerland. It was made of a single tree-

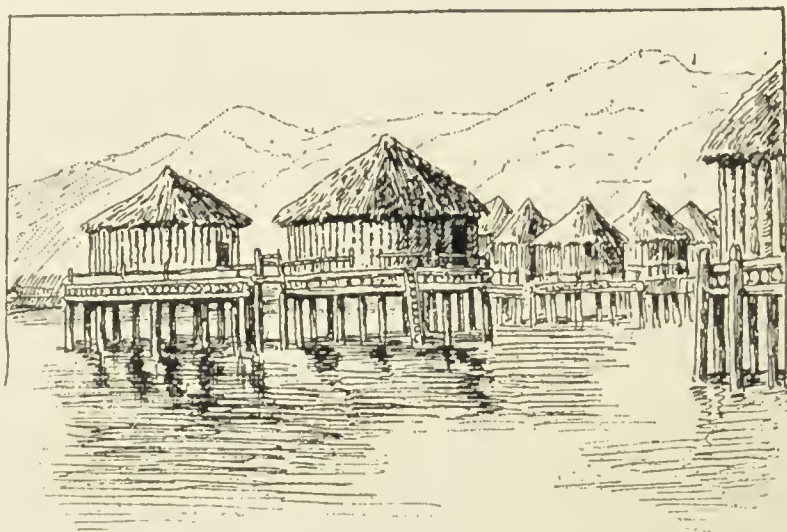


FIG. 29. Sketch showing the probable appearance of a Swiss lake settlement in Neolithic times.

(By permission of Prof. S. Reinach)

trunk, hollowed out by means of fire and stone adzes. Fig. 31 reproduces a photograph of natives of British

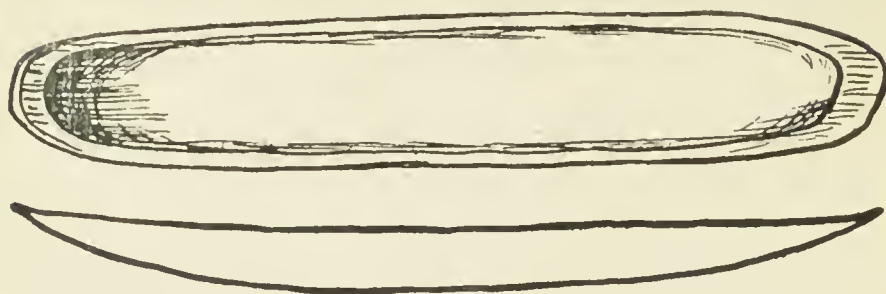


FIG. 30. Outlines of a dug-out canoe from the lake settlement of Robenhausen, Switzerland.

New Guinea, who, except for foreign interference, are still in their Stone Age, hollowing out a canoe in

exactly the same way by means of stone adzes, thus giving us an illustration of the boat-building methods of the Swiss lake-dwellers some thousands of years ago.

Some of these lake settlements were very extensive. One at Sutz, on the Lake of Bienne, stretched over six



FIG. 31. Natives of Keapara, New Guinea, hollowing out a canoe with stone tools.

acres and was connected with the mainland by a bridge nearly a hundred yards long and forty feet wide. One of the most important of the Swiss lake sites is that of Robenhäusen, in a peat-bog formed over what was once the bed of Lake Pfäffikon. Three layers of refuse apparently represent three successive destructions and abandonments of the village. The first destruction

was by fire, and a vast number of articles of all descriptions were recovered, having been dropped or left behind by the inhabitants in their haste to escape. This lowest layer contained implements of stone and bone, all showing signs of having been burnt. Some time must have elapsed before the settlement was rebuilt, for the next layer shows a higher type of civilisation. It contained implements of stone and bone, and also pottery, corn, apples, fragments of cloth, and numerous other relics. The last settlement belonged to the Bronze Age.

CRANNOGS

The lake dwellings in the British Isles, called crannogs,¹ were constructed on a different plan. They were not built on piles, but on shallows or islets in the lakes. Sometimes a natural islet was fortified by a stockade or fence surrounding it, but more often the island was artificially raised by layers of logs, stones, brushwood, heather, &c. The huts, as on the Continent, were built of wattle and daub, and a causeway sometimes paved the way to the shore; but the settlement was more easily defended when the only means of communication was by boat. These crannogs are abundant in Ireland, and not uncommon in Scotland; but as they were occupied in some cases down to historic times it is difficult to determine the date of their construction. A few were probably built in Neolithic times, but the greater number belong to the Metal Ages, and the most famous of all the British

¹ Crannōg is an Irish word meaning a structure of timber, from *crann* = a tree.

settlements, that of Glastonbury, gives us a picture of the civilisation of Britain just before the Roman conquest.

DOMESTICATION OF ANIMALS

In the Danish kitchen middens the only domestic animal is the dog. In the earlier lake dwellings the bones of domestic animals are rare, those of wild animals abundant. In later deposits the proportion is reversed. These steps indicate the transition from a hunting to a cattle-rearing life.

Man in the Palæolithic Age had no domestic animals; bones of the horse, the ox, and the boar in cave deposits show that these contributed to the food-supply, but they were still living in a wild state, and the dog had not yet become the friend of Man. The dog was, however, the earliest of all animals to be tamed, and this was at a time so long ago that its origin is a matter of dispute.¹ Evidence of the domestication of the dog is first found in the Danish kitchen middens (see Note 10, Appendix), but its remains are rare in British long barrows. Since the dog is of little use for food, it was probably originally kept as a pet. The first step in the domestication of animals is the adoption of helpless infancy. The young animal, whose natural protectors have perhaps fallen a prey to the weapons of the hunter, is by him brought back to his home to be fed and tended by his wife and children.

¹ Naturalists are not agreed as to the origin of the domestic dog. Some believe it to be a distinct species, no longer existing in a wild state; others think it is the descendant of some wild or half-wild race, such as the wolf or jackal; others, again, regard it as the product of a cross between two or more wild species or races.

Many savage or semi-civilised peoples, who have no domestic animals, keep wild creatures as pets. The Pueblo Indians capture young hawks, wild cats, and badgers, tether them by strings, and succeed in taming them. The Campas of Peru tame wild boars and tapirs, who will follow their owners about like dogs. These animals are not kept for their use in providing food or clothing. It is different with the silver fox, kept by the Eskimo for its fur; the eagle, captured and tended by the Navaho for the sake of its feathers; or the young kid, lamb, or calf brought home by the hunter, and reared for its fleece or its flesh.

The reindeer in the frozen North provides a good example of the stages in the domestication of animals. The Eskimo of North America live solely by the chase; they hunt the reindeer, and make no attempt to capture or to tame it. Various tribes in Siberia, such as the Chukchi, have captured, but not tamed, the reindeer. They possess large herds which serve for food or barter. They cannot be milked and are of little use in transport. It is among the Lapps and Samoyeds that the true value of the reindeer is developed. These people have no industries, they do not till the ground, they do not spin or weave, and know nothing of pottery-making or metal-working. They live on the reindeer. Milk, cheese, flesh, and blood provide the food; skins furnish the clothing and tents; and when the herds have exhausted the scanty lichen "reindeer moss" in one district, their backs or the sledges which they draw transport the group to pastures new.

Six species of domestic animals¹ are found in the Swiss lake dwellings—the dog, pig, horse, goat, sheep,

¹ Note 16, Appendix.

and ox. The bones of the ox and the wild deer are more numerous than those of all the other animals, showing that Man had by no means yet relinquished his hunting life. There are indications, however, that this stage is not far off. The domestication of animals marks the first step, the beginning of agriculture the second.

AGRICULTURE

The origin of agriculture, like the origin of cattle-rearing, is hidden in obscurity. There are still peoples living in areas suitable for cultivation who yet never dig or plant, sow or reap. This is not because they do not know that plants or seeds, properly planted and tended, grow and increase, but because, possessing little foresight, and having enough for present needs, they do not consider that the rewards are worth the labour. For agriculture, even of the simplest forms, is arduous, and cannot compare with the charms of a hunting life. Yet in many hunting communities the beginnings of agriculture are already established. While the men are in pursuit of the game, the women tend their little corn patch or garden. Then, when game or natural produce fails, or other circumstances threaten famine, the men also turn to the cultivation of the soil. And so the first steps are taken. We can trace some of the beginnings of agriculture in Australia. In most parts of Australia there is no attempt to practise even the most simple agriculture. Man lives by gathering wild fruits, catching game and fish, and collecting various edible products provided by nature. And since the natives use more than three hundred species of vegetables for food, and enjoy abundant feasts of many kinds of insects and their grubs, honey and

clay, it is not surprising that they do not undertake agricultural operations in their dry and thirsty land. Still, in some parts of the west there is an attempt to foster natural growth by artificial means. Any one uprooting an edible plant is punished, and a species of flag is set fire to in order to improve the next crop. In other parts we see a further stage, the beginnings of actual cultivation. The natives, after digging up the tubers of the wild yam,¹ insert the leafy tops in the ground to take root again.

It is unlikely that any form of agriculture was practised in Palæolithic times, and there is no trace of its existence in the Danish kitchen middens, which are usually regarded as representing the early stages of Neolithic culture. But the Swiss pile dwellings have preserved abundant evidence of a fairly advanced stage in agricultural operations. Besides nuts of various kinds, hazel, beech, and walnuts, acorns, sloes, apples, pears, strawberries, raspberries, blackberries, and vines, some of which were undoubtedly cultivated, three varieties of wheat have been identified, two of barley and two of millet. Wheat is the commonest grain, and many bushels have been recovered from the settlement of Wangen, Lake of Constance. Flax was also extensively grown. It is owing to the happy circumstance that the pile dwellings on the edges of the smaller lakes have been slowly covered over by peat that their contents have been so wonderfully preserved. Perhaps the most remarkable of all the relics are the bits of charred bread and scraps of woven linen. The occurrence of bread shows that the corn was ground, and the grinding-stones or crushers have been recovered.

¹ Yam (*Dioscorea*), a relation of our black bryony, with a thick underground stem, which is a valuable food-stuff.

These consist of simple flat slabs of hard stone, one surface of which has been worn into a concave depression by the constant rubbing of the stone rolling-pin or muller. A similar type is found in Britain (Fig. 32), though few examples can with certainty be attributed to the Neolithic period; they were in

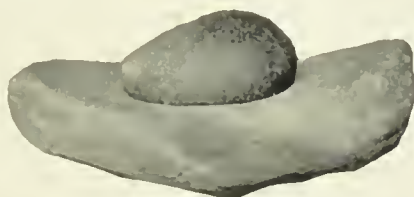


FIG. 32. Stone muller for grinding grain. Ireland.

use until a few centuries ago in Ireland, and are still the only form of mill known in parts of Africa.

These grinding-stones or crushers were doubtless used for pounding roots and other tough substances by people who had no knowledge of corn, so it is not certain that their rare occurrence in Britain before the Bronze Age indicates that grain was already grown. The roots of the bracken are beaten with a stone and made into meal by North American Indians, and stones are used for pounding fern-roots in New Zealand.

PRIMITIVE INDUSTRIES : BASKETRY

We come now to a group of primitive industries of great importance, basketry, spinning, weaving, and pottery, but we have to turn to savage races to understand something of their inestimable value in the life of Primeval Man.

Basketry includes all constructions of twigs, leaves, grasses, osiers, and a variety of other materials, plaited

or interwoven by hand without the help of machinery. It is the most universal and probably the most ancient of the industrial arts, as it preceded pottery, and, by a natural process of evolution, leads up to weaving. Unfortunately, owing to the perishable nature of its materials we have very little evidence as to the many uses for which basketry was employed in Neolithic times. Wickerwork fences or breakwinds such as the Australian native erects at the present day were no doubt among the first steps in house-building in the Palæolithic Age. And both types of Neolithic house-building, the pit dwellings and those built on piles, afford early examples of basket-work, the walls or roofs being of stakes or osiers interlaced and coated with clay. Dug-out canoes, hollowed out of a single tree-trunk, have been found in the Swiss lake dwellings (as seen above, p. 104); but boats of interlaced osiers, covered with hides, such as were found by the Romans on entering Britain, and are still used in parts of Ireland and India, would have been more suitable for the sea-fishing of the occupants of the Danish kitchen middens.

No doubt the Neolithic lake-dwellers, like those of the present time, used baskets for fishing, as also for collecting shell-fish, vegetables, fruit, grain, and all natural or cultivated produce. Before pottery was invented most of the household vessels were of basketry. To make these more serviceable a layer of clay was daubed over the wickerwork, forming either an outer coating or an inner lining. Clay-lined baskets are used by the Indians of California for holding water, for boiling food, for parching grain, and for many other purposes. By frequent heating the clay becomes hardened, and perhaps the basket-work

is charred away, and thus a clay pot is left. It may be that in some parts of the world the art of pottery originated in some such accidental discovery, but as a rule (save in Australia and parts of Melanesia and Polynesia) wherever clay is found there are also potters, and though baskets are used for moulding pots in many parts of North America, the method does not occur among savage potters elsewhere.

POTTERY

Just as we can conjure up a picture of the Neolithic quarryman and flint implement maker by going to Brandon, where the industry has been carried on uninterruptedly for many thousands of years, so in another part of the British Isles we can watch the Neolithic potter at work. And in Britain, as in the remotest parts of the savage world, the rule holds good : man is always the tool-maker, while basketry and pottery are the work of the women.

At Barvas, towards the northern end of Lewis, in the Outer Hebrides, there are a few women who still make rough pottery by hand, without the aid of a wheel. The clay is kneaded between the hands to the right consistency, and moulded with the fingers to the required shape. It is fired by being placed on the hearth and covered with burning peats. The Barvas pots are usually undecorated, but those of the Neolithic Age often show simple forms of ornamentation impressed while the clay was still wet. The pots of the Danish kitchen middens sometimes have a few cuts or impressions round the top ; those of the settlement of Whitepark Bay, Co. Antrim, exhibit ornamentation made by impressing cords in the wet clay, and the pottery from

the long barrows is often decorated by marks made with a notched implement, or by the impression of the natural ribbing of a shell. We can recognise the steps by which Man gradually perfected himself in tool-making, but there seems to be no possibility of tracing



FIG. 33. Barvas craggan, in author's possession.
These were formerly used as milking-pails.

the gradual evolution of pottery. Coarse and fine examples, ornamented and plain, are found through both the Neolithic and the Bronze Ages, and it is seldom possible to say to which period any particular specimen may belong.

TEXTILES

It appears that Man can exist without the knowledge of how to make fire (*cf.* p. 54), but no people have ever been discovered without the art of making string.

The string may be of human or animal hair, as in Australia; of hemp, as in North America; or of coconut fibre and innumerable other materials in the richly endowed Pacific area. The Old World is less well off for vegetable products, and the earliest strings were probably fine strips of hide or sinews, twisted together. These are used in the treeless areas of the Arctic regions, and, judging from the bone needles such as that found in Kent's Cavern, Torquay (*see* p. 70), Palæolithic man sewed his skins together for clothing, just like the Eskimo of to-day. The commonest textile materials found in the lake dwellings were flax, fibres of the bark of the lime-tree, and wool. The primitive methods of growing, preparing, spinning, and weaving flax could have been seen until lately in almost any part of Scotland, and the processes probably differed very little from those of the Neolithic Age. 1. The flax is pulled by hand, roots and all. 2. It is rippled—that is, the bolls or seeds are combed off from the stalks. 3. The stalks are retted or rotted by being soaked in water for a week or so, to separate the fibres from the outer bark. 4. It is spread out on the grass to dry. 5. It is scutched or beaten to separate the woody core from the silky fibres. The combs for rippling are often found in the deposits of the Swiss lake dwellings, and certain stone clubs are believed to be those used in scutching. (In Pliny's time, however, the mallets were of wood.) Flax was used for making fishing lines and nets, ropes and cords, besides being woven into linen.

The simplest way of making string is to twist the threads or fibres with the fingers or between the palms of the hands. A longer spin is obtained by twisting them on the thigh, as an Australian makes human-hair

strings. The abundance of spindle whorls of clay and stone found in the Swiss lake dwellings¹ shows that the use of the spindle had already been discovered. By means of the spindle—a short piece of stick weighted



FIG. 34. Wooden spindle, with hook, and stone whorl.

at one end by the spindle whorl—the threads can be given a continuous twist (Fig. 34).

The recovery of scraps of woven material shows that the loom had already been invented, but, except for the occurrence of clay discs, usually taken to be loom-weights used to stretch the warp threads, we have no information as to its construction.

¹ Probably none of the spindle whorls found in Britain are earlier than the Bronze Age.

CLOTHES AND ORNAMENTS

Although Man in the Neolithic Age clothed himself with woven stuffs, he still wore garments made of skins and painted and tattooed his body. Colouring matter is often found buried with the dead, and the painting of the bones and skulls after death doubtless reflects the fashions of the living. Tattooing seems to be indicated by the markings on clay figures found on Neolithic sites, and we know from the evidence of classical authors that it persisted among the Thracians to historic times, while Cæsar's report of the fashion of body-painting among the ancient Britons is familiar to all.

Ornaments, though rare in Britain, are numerous in Continental graves. All traces of feathers, quills, plumes, strips of fur or hide, seeds, and the innumerable materials used for decorative purposes by savages in all parts of the world have long since disappeared. Such ornaments as remain are mainly strings of beads (probably worn as collars), pendants, bracelets, and rings. They are made of various kinds of stone, of bone, rarely of jet or amber, more rarely still of coral or turtle-shell. As in the Reindeer Age, strings of shells were a favourite form of ornament. Pendants of teeth were worn, as in earlier ages, and tusks of the wild boar, jaw-bones, and pieces of stags' horn. Among the most interesting of the pendants are discs made from human skulls, found in Central France, for they seem to be something more than mere ornaments, and to partake of the nature of amulets. Trepanation¹ of the skull of the living was

¹ Trepanning or trephining, removing a piece of the skull, Greek, *trupan* = to bore.

evidently not uncommon in the Neolithic Age, and it is frequent among savages possessing only stone or shell implements to-day. In parts of Melanesia the operation is resorted to for fracture of the skull, epilepsy, or brain trouble, and there is a case on record of a New Ireland man whose skull was trepanned no less than eight times, and who died from the blow of a tomahawk some years later. Neolithic Man seems to have regarded those who survived the operation as possessed of special virtue, for many of the skull discs show evidence that the skull had been trepanned during life.

GENERAL SURVEY OF THE STONE AGE

When we remember the enormous duration of the Stone Age we see that it is impossible to regard its culture as a whole, or to obtain a coherent picture of the men who were living and dying all through the countless centuries, leaving here or there some imperfect scrap of evidence to prove that they once inhabited the earth. All we can attempt is to trace, by means of an occasional hint, the gradual physical and cultural evolution of Man.

Of Man at the beginning of the Palæolithic Age we know practically nothing, save that he differed from the brutes in being able to kindle fire and to hammer out tools and weapons of stone. Of his physical features we are entirely without proof, but those blessed with the power of imagination may conjure up a vision of a short, stunted being, not yet fully upright, with sinewy limbs and hairy body. Low forehead, fierce beetling brows, projecting jaws and powerful teeth, give his face a bestial appearance, and those who regard the

features of the chimpanzee or of the Australian native as repulsive would apply the same epithet to Chellian Man.

Many thousands of years passed. The climate changes, the fauna changes, and Man doubtless changes too. His growing intelligence shows itself in the variety of his tools and skill in their making. We have a glimpse of his physical appearance where from actual skulls and bones artistic imagination reconstructs his features.

The latest stages of the Palæolithic Age give us a clearer view. Man has now reached a high level of intelligence. His work in stone, bone, antler, and ivory shows wonderful skill and dexterity, besides powers of invention. Work becomes specialised ; trade develops, and intercourse sharpens men's wits. We learn details of dress, personal ornaments and decoration, and we can compare the culture of this period with that of backward races of the present day, though in some particulars Palæolithic Man reached an excellence to which no savage and few civilised peoples have attained. Physically also Man had reached a higher type. The brain, and consequently the skull, increased in size ; the jaw shrank ; both in mind and body we recognise that there is no great difference between primeval and modern Man.

This is still more marked in the Neolithic Age. The race that inhabited the British Isles in Neolithic times still lives in out-of-the-way parts to-day, and down to historic times their culture was little superior to that of the Stone Age. We can trace the gradual progress in civilisation. We see Man, with his companion the dog, fishing and hunting on the coasts of Denmark, living a life very little in advance of that of

the earlier period. Later on we find him herding his oxen and sheep, and perhaps also tilling the soil, and erecting vast sepulchral monuments to be the wonder and the admiration of all time. Lastly, we have a picture of his life in the Swiss lake dwellings, which show the highest stage of civilisation attained by Man before the Age of Metals. We see his well-built, commodious houses, secure from all attack, his flocks and herds on the shores, and his fields of grain and flax. We can picture the dark, swarthy men, clothed in skins or woven garments, decorated with teeth and claws, trophies of the chase, tending their cattle, polishing their stone implements, or fitting the exquisitely made arrow-heads to their shafts, while the women are busy spinning the flax or making the pottery.

RELIGION

There is no question more fascinating, and at the same time more beset with difficulties, than that of the religion of Primeval Man. Our only guides are the few hints found in prehistoric graves which we can try to interpret by the light of savage customs.

There are no savages to whom religion, as shown in a belief in spiritual beings, is not very real. The whole savage world is peopled with spirits, both friendly and hostile, whose goodwill is encouraged or whose anger is averted by magical means. Of the magic of Primeval Man no trace remains, unless the wall-paintings of the Reindeer Age, like the cruder Australian drawings of the present day, are charms to lure the animals represented, and so to supply the hunters with game. Of Primeval Man's conception of a future life we have no certain evidence, though the food and implements

buried with the dead were no doubt intended to be used on the long journey to another world. The proofs of human sacrifices frequently recognised by the explorers of the long barrows indicate the general belief that the souls of slaves or wives are thus set free to continue their service in the next life. Worship of the dead, and especially fear of the ghosts of the dead, plays an important part in many, if not most, primitive religions, and the stupendous sepulchral monuments of the Neolithic Age bear witness to the widespread belief in the beneficence of ancestral spirits whose bodies have been buried with due honour. Idols or images of gods are generally a later development in religion, and we seek in vain for any certain representations of the divinities of Primeval Man. The figure of a man, carved in ivory, found with the human skeleton and remains of mammoth and rhinoceros at Brünn (p. 51), the numerous carvings of female figures in ivory, reindeer antler, and stone at Brassempouy (Landes), Grimaldi, and elsewhere, and the rude representations of women incised in stone in many parts of France, probably had a magical or religious significance. It is even possible, as some believe, that they may show us the earliest attempts of Man to make a graven image of his God.

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GENERAL

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APPENDIX

TABLE I

GEOLOGICAL PERIOD		CHARACTERISTIC FAUNA
Tertiary	Holocene or Recent ¹ Pleistocene ¹	Fauna as at present.
	(Intermittent glacial conditions)	Pliocene mammals persist into early Pleistocene. Southern elephant dies out, being followed by the straight-tusked elephant, and lastly by the mammoth. Etruscan rhinoceros is replaced by the woolly rhinoceros. Wild horse, hyena, and reindeer abundant. <i>Homo primigenius</i> and <i>H. recens</i> .
	Pliocene	Southern elephant, Etruscan rhinoceros, hippopotamus. All anthropoid apes. Man possible, but not yet proved.
	Miocene	Higher mammals, mastodon, sabre-toothed tiger, early types of anthropoid apes.
	Oligocene Eocene	Crocodiles and other amphibians; a few mammals, including the half-apes or lemurs.
Secondary	Various divisions	Reptiles, fishes with bony skeletons, the first mammals, <i>i.e.</i> marsupials (pouched animals like the kangaroo), and the earliest form of bird.
Primary	Various divisions	Lowly forms of life, both plant and animal. Sponges, jelly-fish, worms, snails, molluscs, corals, some early fishes, amphibians, and spiders.

¹ Some writers, especially on the Continent, place the Pleistocene and Recent divisions in a fourth period, which they call Quaternary, and make the Ice Age the boundary between the two; "Tertiary Man," according to their grouping, corresponds with "Pre-glacial Man."

TABLE II

GEOLOGICAL SEQUENCE	CULTURE SEQUENCE		CLIMATE	FAUNA
Holocene or Recent	Metal Age	<div data-bbox="353 1034 415 1166">{ Iron Bronze }</div> <div data-bbox="425 1023 451 1150">Neolithic</div> <div data-bbox="462 831 498 975">{ Late Early Transition }</div> <div data-bbox="467 695 498 815">Azylian</div>	As at present.	Pleistocene fauna gradually disappears from Western Europe.
Pleistocene	Stone Age	<div data-bbox="464 831 515 975">{ Late or Reindeer Age }</div> <div data-bbox="526 608 650 815">{ Magdalenian Solutrian Aurignacian }</div>	Dry cold	{ Reindeer, Arctic hare and fox, marmot, lemming, wild horse abundant.
		<div data-bbox="578 831 629 975">{ Mid or Mammoth Age }</div> <div data-bbox="640 639 723 815">{ Mousterian }</div>	Damp cold	{ Mammoth, woolly rhinoceros (<i>tichorhinus</i>), giant Irish deer, cave bear.
		<div data-bbox="692 991 754 1134">Palaeolithic</div> <div data-bbox="702 831 754 975">Transition</div> <div data-bbox="764 655 795 815">Acheulian</div>	Transition.	Hippopotamus, straight-tusked elephant, small-nosed rhinoceros (<i>Merckii</i>), cave hyena.

NOTE 1

CLASS, ORDER, FAMILY, GENUS, SPECIES. When a number of animals are sufficiently alike in essential characters, such as general shape, proportion of parts, habits of life, colour, and bodily structure, they are grouped together to form a SPECIES. Thus all domestic cats form one Species, *Felis domestica*. The characters of a species may so resemble the characters of another that several species fall naturally together in a GENUS. For example, the three separate species of cats, lions, and tigers are alike in general outline, in the shape of their heads, in the power of drawing in their claws, &c. These three species form the Genus *Felis*. There are other cat-like forms, which are not sufficiently like cats, lions, or tigers to be included in the genus *Felis*, which must yet be placed with them in a larger group, the FAMILY of the *Felidae*. All the *Felidae* are flesh-eaters, with claws and canine teeth to catch and hold live prey. So the Family of the *Felidae* is grouped with the other Families having the same characters in the ORDER of the *Carnivores* or flesh-eaters, distinct from the *Insectivores* or Families of insect-eaters, the *Marsupials* or Families of pouched animals, and so on. But *Carnivores*, *Insectivores*, *Marsupials*, and other Orders all suckle their young in the same way, hence they are grouped together in the CLASS of Mammals. (See W. W. Watts, *Geology for Beginners*, pp. 199–200.)

NOTE 2, p. 23

BRAIN. Within certain limits the actual size of the brain (as estimated by the dimensions of the interior of the cranium or brain-case) is not the most important factor in mental evolution. Man has a larger and heavier brain than woman; the ancient Egyptians had a higher cranial capacity than their modern representatives, and primeval woman (as calculated from the Cro-Magnon skeletons) had a larger brain than that of the average man of the present day.

NOTE 3, p. 28

PRIMEVAL MAN. Man in the Palæolithic Age in Western Europe is often referred to as Palæolithic Man, but the term is ambiguous. Strictly speaking, *palæolithic* cannot refer to time, but merely to culture, and so can be used of the Tasmanians, who were living in their Palæolithic Age when the Europeans first settled in the island in the nineteenth century, as correctly as of our ancestors of thousands of years ago. It is therefore better, when referring to these latter, to speak of *primeval* Man, which means first in time, from Latin *primævus* = in the first period of life.

NOTE 4, p. 29

SAVAGE. The name savage (from Latin *silvaticus* = woodland, *silva* = a wood or forest) is here used (as commonly in ethnology) in its original meaning of "living in a state of nature, wild, untamed," not in the secondary sense of "fierce, ferocious, cruel."

People are grouped, according to their state of civilisation, under the following headings: ¹

1. *Savage peoples.* These progress exceedingly slowly, making scarcely any change in their way of living from generation to generation. They live in small independent groups. They have no writing, though they may possess pictographic methods. They live by hunting, fishing, or collecting plants and fruits, as, for example, the Bushmen of South Africa, the Australians or Fuegians; or they practise a little simple agriculture, such as the North American Indians, Melanesians, and African negroes.

2. *Semi-civilised peoples.* These make slow progress too, but show distinct signs of advance. They live in larger groups, forming states under organised government. They have elementary forms of writing and the beginnings of literature. They may be agriculturists, such as some Chinese and Malay peoples and ancient Egyptians, or pastoral nomads, such as the Mongols or Arabs.

3. *Civilised peoples.* These make rapid progress. They live in dense groups, forming states based on individual liberty. They have writing and a developed literature. To this group belong the majority of the peoples of Europe and North America.

NOTE 5, p. 31

IMPLEMENT. As the use of a particular object is often a matter of doubt, and the same objects were probably used both as tools and weapons, as knives are now, it is convenient to employ the general term implements

¹ Cf. Deniker, *Races of Man*, Contemporary Science Series, London, 1900, p. 127.

to include both tools and weapons. Implement is from Latin *implēre*, to fill, in the sense of "that which serves to fill," hence in the plural an outfit, and in the singular a tool or instrument.

NOTE 6, p. 31

CELT. The name celt (pronounced "selt") is applied to the implements with sharpened edge, made either of stone or of metal by prehistoric Man. The history of the word is curious. It is probably derived from a mistake in the Vulgate translation of the Old Testament, *celte* being written for *certe*, surely, in Job xix. 24, from an assumed Latin *celtes*, chisel, which is not found elsewhere. The word is not a good one, but it has now been in use as a technical term in archæology for more than two centuries, and it is difficult to replace it. It has no connection with the Celts or Kelts of history.

NOTE 7, pp. 46, 85

HOMO PRIMIGENIUS IN MORAVIA, and the GIBRALTAR CRANIUM. In a cave at Shipka, near Stramberg, a portion of a human jaw was found underneath layers containing mammoth, reindeer, and rhinoceros bones, together with rude implements of quartzite.

At Predmost remains of eight or nine hundred skeletons were found, with thousands of mammoth bones and implements belonging to the Solutrian stage of culture.

THE GIBRALTAR CRANIUM. It is not proposed to give a complete list of all the remains of *Homo primigenius* hitherto discovered, and none but undis-

puted examples have been referred to. An exception must be made, however, in favour of the Gibraltar cranium. This was found in a quarry at Gibraltar in 1848, and presented to the Royal College of Surgeons in 1868. Unfortunately, beyond these two facts we know very little of its early history. It is of extraordinary value, as some of the face bones are in place, presenting a less human appearance than any human remains yet discovered, and it possesses several unique characters which distinguish it from any other cranium, past or present.¹

NOTE 8, p. 48

The full significance of the later discoveries can only be appreciated when we realise that up to 1908 no unquestionable Palæolithic skeleton had been discovered *with the face bones still in place*. Hence many earlier estimates as to skull measurements, and all speculations as to personal appearance, were unsatisfactory. The unexpected discovery that *Homo primigenius* had an absolutely larger brain space than that of modern Man upset many of the earlier theories as to mental evolution.

NOTE 9, p. 52

HOMO PRIMIGENIUS IN CROATIA. At Krapina, in Croatia, Gorjanovic-Kramberger found portions of ten to twelve skulls, more than a hundred bones, and a hundred and forty-four teeth, belonging to persons of all ages. The discoverer here recognised evidence of

¹ Cf. W. J. Sollas, *Phil. Trans. Roy. Soc.*, 1907, vol. 199, p. 281.

- cannibalism, which has been much disputed. The skulls were so fragmentary that very little could be learnt from them, but some are believed to show a variety of the Neandertal type. It is, however, possible that the variation may be due to youth.

NOTE 10, pp. 67, 107

KITCHEN MIDDENS. A translation of the Danish *kjökkenmöddinger*, kitchen refuse-heaps, also called shell-heaps.

Early in the nineteenth century the attention of geologists in Denmark was drawn to the large mounds, often hundreds of yards long, occurring along the eastern shores. These are formed of shells, principally oyster-shells, together with bones of fish and animals, which had been used for food, and contain flint implements and fragments of pottery. Similar heaps have since been found on the coasts of France and the British Isles, and elsewhere. They can be seen in course of formation in Tierra del Fuego. The inhabitants subsist mainly on shell-fish, and their refuse-heaps are sometimes nearly a mile long. The European shell-heaps evidently represent the refuse of the meals of prehistoric settlements belonging to a low stage of culture, and appear in Denmark to mark the earliest period of the Neolithic Age, for the implements are of a rude type, and the only domestic animal is the dog. Moreover, the oyster and other shells contained in the heaps are different from those now found in the Baltic, and indicate a great change in geographical conditions.

NOTE 11, pp. 76, 79

There were two species of wild ox in Pleistocene times :

1. The urus, or aurochs, *Bos urus* or *primigenius*, a far larger beast than our present ox. This was living in Prussia, Poland, and Lithuania down to the seventeenth century, but is now extinct.

2. The bison, *Bos bison* (sometimes improperly called aurochs). This animal, with his thick mane and arched back, was the favourite subject of the cave artists of the Reindeer Age, and still lives a protected life in Lithuania. The American bison, improperly called "buffalo," is a closely related species.

NOTE 12, pp. 80, 95

These prehistoric monuments of one or more blocks of unwrought or roughly shaped stone have been unfortunate in the names applied to them. In England they are usually termed "rude stone monuments." The National Congress of Anthropology and Prehistoric Archaeology at Paris adopted the name megalithic monuments, shortened to megaliths, as a general term, in 1867. But French archaeologists of the previous century had already bestowed the Celtic names, *dolmen* and *cromlech*, on two out of the four main types of megaliths; both of these names are of doubtful origin, and one was misapplied.

The four megalithic types are :

1. A standing stone, usually called a menhir, from Breton *men* = stone, and *hir* = long.
2. An alignment or avenue, a row of such stones.
3. A stone circle formed of upright stones arranged

in a circle, as at Stonehenge (Fig. 20), or Callernish, in the Outer Hebrides (frontispiece).¹

4. A dolmen or cromlech, two or more blocks of stone placed on end, supporting a roofing stone (Fig. 27). Dolmen is usually explained as from early Breton *tôl*, Latin *tabula*=a table, and *men*=stone, but no such word occurs in Breton. Cromlech, whose derivation is doubtful, is an old Welsh word popularly applied to these structures in Wales since 1700, and in use in Cornwall before the Norman Conquest. Unfortunately, this was the word selected in France for the stone circles.

NOTE 13, pp. 46. 82

The word race should be restricted in anthropology to one of the larger divisions of mankind having certain physical characters in common. In distinguishing the races of the world, the character of the hair is usually taken as the chief test, and mankind is classed as *Ulotrichi* (Greek *oulos*=woolly, and *thrix*, *trichos*=hair), frizzy- or woolly-haired, such as the negroes: *Cymotrichi* (*kyma*=wave), wavy-haired: and *Leiotrichi* (*leios*=smooth), or straight-haired, such as the American Indians or Chinese. All the European races belong to the *Cymotrichi* or wavy-haired group. The next test is that of head-form, and people are classified according to their cephalic index. This is obtained by measuring the greatest length and the greatest breadth of the head in millimetres, and expressing the breadth as a fraction of the length. The formula is $\frac{\text{breadth} \times 100}{\text{length}} = \text{cephalic index}$.

¹ The Callernish circle has alignments stretching out in the form of a cross.

Skulls are classed as dolichocephalic (Greek *dolichos*=long, *kephale*=head) when the index is below 78, and brachycephalic (Greek *brachys*=short) when the index is above 78. The present population of Europe (excluding a few late Asiatic intruders on the eastern borders) is composed of three main races :

1. The Mediterranean Race, distributed all round the Mediterranean, and in Wales, Ireland, parts of Scotland, and South-west England, dolichocephalic, short and slender, dark complexion, hair, and eyes.

2. The Central or Alpine Race, across Central Europe, rare in Britain, brachycephalic, with tall and short varieties, sturdy build, medium colouring, often brown hair and grey eyes.

3. The Northern Race, in Northern Europe, and the greater part of Britain, dolichocephalic, tall stature, fair hair and eyes.

NOTE 14, p. 91

Neither of these methods is common among uncivilised peoples. In some parts (Oceania) the stone is lashed on to a handle with a natural shoulder (see Fig. 31); in other regions (America) a strip of hide or of flexible wood is doubled round the stone; elsewhere (Australia) use is made of gum or other sticky substance, as well as lashing. The stone-headed clubs of New Guinea, however, were perforated for the insertion of a wooden handle, after the Neolithic method.

NOTE 15, p. 92

Professor Rau, of New York, made some experiments in boring holes with a pump drill, sand, and water. Two hours of constant labour on a piece of hard stone (diorite) scarcely deepened the hole the thickness of a lead-pencil line. Dr. Keller experimented with a hollow portion of ox-horn and quartz sand, which he found surprisingly effective.

NOTE 16, p. 108

Since all the domestic animals were derived from the wild species, it is difficult to distinguish the bones of the former from those of the latter class. The following points give some help:

<i>Domestic Animals</i>	<i>Wild Animals</i>
All parts of the skeletons are found.	All parts not found (animals dismembered where slain).
Bones of old animals rare.	Some very old animals found.
Females commoner than males.	Sexes about equal.
General resemblance to existing domestic species.	General resemblance to existing wild species.

APPENDIX

ADDITIONAL NOTE to p. 38

EOANTHROPUS DAWSONI. When some workmen were digging gravel for road-mending near Piltdown Common in Sussex, they came upon a portion of a human skull. Charles Dawson, a local geologist, had asked them to preserve any fossils that they might find, so the fragment was handed to him, and, when visiting the spot later (1911) he picked up another piece belonging to the same individual. In 1912 a careful search was made in co-operation with A. Smith Woodward, and two more fragments were recovered, including the greater part of a jaw, with two molar teeth still in place. A canine tooth was found by P. Teilhard in the next year. Fossil remains of the teeth of hippopotamus, beaver and the horns of red deer found in the same beds indicate a Lower Palæolithic date, perhaps Chellean, and the roughly shaped flint implements would support an even earlier stage of culture, but the actual age of the gravels "has not yet been definitely ascertained."¹ Piltdown Man, however, takes his place beside *Pithecanthropus* and *Homo Heidelbergensis* as representing the earliest human or semi-human forms that we have yet discovered. The remarkable character of the skull, as reconstructed from the fragments, has given rise to much discussion.² The brain-case is truly human, though the brain, from the evidence of the internal cast, studied by Elliot Smith,³ is the most primitive and most simian human brain so far recorded. The

¹ W. J. Sollas, *Ancient Hunters*, 1915, p. 55.

² "On the Discovery of a Palæolithic Human Skull and Mandible," etc., *Quart. Journ. Geol. Soc.*, vol. lxi., part i, 1913, p. 117; also, A. Keith, *The Antiquity of Man*, 1914.

³ "On the Discovery," etc., p. 145.

APPENDIX

jaw presents undoubtedly simian features, and the canine tooth finds no parallel in any human jaw, being closely related to the milk teeth of the chimpanzee. There are many features which suggest that the skull was that of a woman, about thirty years old, and it is regarded as representing a hitherto unknown species of *Homo*, for which the name *Eoanthropus*¹ has been adopted, coupled with the name of the discoverer.²

NOTE TO PAGE 115, line 24 :

6. The final process is combing with a heckling comb, to remove the core.

¹ From "eōs," dawn; and "anthrōpos," man.

² As in the case of *Pithecanthropus*, it has been suggested that the cranium is that of a human being, and the jaw that of a chimpanzee, and this view has strong supporters, but the chances against such an extraordinary coincidence are overwhelming. Moreover, this "missing link" was just what evolutionists had been expecting to discover, "one which had already attained to human intelligence, but had not yet wholly lost its ancestral jaws and fighting teeth."—W. J. Sollas, *loc. cit.*, p. 55.

INDEX

- ACHEULIAN culture stage, 61-2, 68, 126
- Africa, connection with Europe, 24 ; pile dwellings in, 102 ; stone mill in, 111
- Agriculture, 109-11
- Alpine Race, 82 *n.*, 135
- Ape, *Pliocene* (*Paleopithecus*), 20
- Apes, relation between Man and, 20-1 ; distribution of, 24 ; 47
- Arrow-heads, 72 *n.*, 89, 93, 120
- Art of Primeval Man, 64-5, 76, 121
- Artifacts, evidence of, 28-9 ; Palaeolithic, *chap. iii. passim* ; Neolithic, 88 *ff.*
- Aurignac, 63-4
- Aurignacian culture stage, 63-4, 68, 126
- Aurignacian Man, *see* Combe Capelle
- Aurochs, *see* Urns
- Australia, natives of, compared with Primeval Man, 29-30, 89, 119, 129 ; agriculture in, 109-10, 112, 113, 115 ; magical drawings in, 120
- Avebury, stone circles at, 81, 96, 97
- BALLYMASCANLAN cromlech, 98
- Barrow, long, 80, 82, 83, 95, 121 ; round, 80 *n.*, 82, 83
- Barvas, pottery, 113-4
- Basketry, 111-3
- Baumes-Chaudes, caves of, 86
- Bear, 20, 38, 67, 71, 80
- Bison, 63, 71, 76, 79, 133
- Borneo, pile dwellings in, 102
- Bow and arrow, 72, 89, 93
- Brain, 22, 48, 128, 131
- Brandon, flint industry at, 90, 93
- Bread from Swiss lake dwellings, 110
- Britain, 20 ; geography, fauna and flora in Palaeolithic Age, 26-8 ; Palaeolithic Man in, 36-8, 77-8 ; bronze in, 33 ; 65 ; Palaeolithic implements in, 66-71 ; Neolithic Man in, 78, 80-4, 119 ; geography, fauna and flora in Neolithic Age, 78-80 ; transition stage in, 87 ; Neolithic implements in, 88 *ff.* ; Neolithic monuments in, 94-9 ; habitations, 100, 106 ; agriculture in, 111 ; pottery in, 113 ; spindle-whorls in, 116 *n.* ; clothes and ornaments in, 117
- Brixham Cave, 67, 70
- Brünn, skeleton found at, 51, 121
- Bury St. Edmunds, fragment of skull from, 37
- Bushman paintings, 65 *n.* ; habitations, 72, 100
- CADDINGTON, 68-9, 74
- California, clay-lined baskets of, 112
- Callernish stone circle, 96, 97, 134
- Carnac, megaliths, 96
- Cave implements, 69
- Caves, occupied by Primeval Man, 40 *ff.*, 52, 65, 67, 69-71, 72, 74
- Celt, 31, 130
- Chancelade, human remains at, 52
- Cheddar, skull found at, 38, 50
- Chellian culture stage, 61, 68, 70, 126

- Chukchi, and domestication of the reindeer, 108
 Combarelles, Grotte des, 40, 41, 74
 Combe Capelle, skeleton found at, 49-50, 64
 Crannog, 106
 Creswell Crags, caves of, 69-70
 Cro-Magnon, 40, 41 : skeletons found at, 51-2 : 85, 86
 Cromlech, 81, 97-8
- DANCING, 76
 Dartmoor avenues, 96
 Deer, 79, 87, 109
 Deer, giant Irish (*Megaceros hibernicus* or *Cervus megaceros*), 20, 38, 71
 Denmark, prehistoric remains in, 67, 107
 Dog, 71, 72, 80, 107, 108
 Dol, menhir at, 96
 Dolmen, *see* Cromlech
 Dordogne, district of, 10, ff.
 Druids, 99 n.
 Duruthy cave, 52, 76
- EGYPTIANS, cranial capacity of, 128
 Elephant, southern (*E. meridionalis*), 19
 Elephant, straight-tusked (*E. antiquus*), 20, 47
 Engis, portion of skull found at, 45
 Eoliths, 58
 Eskimo knives, 60 ; scrapers, 63, 115
- FIRE, use of, by Primeval Man, 51-6
 Flax, 110, 115
 Flint implements, Palæolithic, 59 ff., 73-5 ; Neolithic, 84, 86, 88 ff.
 Food of Primeval Man, 73, 109
 Fossils, evidence of, in evolution, 18, 19
 Furfooz, caves of, 45
- GALLEY HILL, skeleton found at, 36, 50
 Geology, evidence of, 17-9, 23-5
 Gibraltar Cranium, 130-1
 Glastonbury, lake village at, 107
 Grimaldi Caves, 51 ; skeletons found in, 52, 76, 85
 Grossgartach, Neolithic village at, 101
- HABITATIONS, Palæolithic, 72 ; Neolithic, 100-7
 Harpoon, 66, 72
 Hippopotamus, 19, 20, 36 ; Age of the, 61, 126 ; 71
Homo Heidelbergensis, *see* Mauer jaw
Homo primigenius, 38, 40-8, 125, 130, 131
Homo recens, 38, 39, 49-52, 125
 Horse, 40, 63 ; carving of head of, 65 ; 71, 80, 107 ; domestication of, 108
 Hyena, 20, 35, 67, 71
- ICE Age, 27, 125
 India, 23 ; megaliths erected in, 98 ; wickerwork boats in, 112
 Ireland, 28, 33 ; Neolithic Man in, 78 : 98 ; pile dwellings in, 102, 106 ; stone muller from, 111 ; wickerwork boats in, 112 ; pottery in, 113
 Ivory worked by Palæolithic Man, 61, 65, 71
- KENT'S Cavern, 70, 115
 Kingstone, 96
 Kitchen middens, Danish, 67, 107, 110, 112, 113, 132
- LA CHAPELLE-AUX-SAINTS, skeleton found at, 39, 40, 43-4
 La Ferrassie, 40 ; skeleton found at, 44
 Lake dwellings, *see* Pile dwellings and Switzerland
 La Madeleine, 41, 64, 75
 La Naulette, jaw found at, 45
 Lapps, and domestication of the reindeer, 108
 Laugerie, 40, 41, 52
 Le Moustier, 40, 41 ; skeleton found at, 42 ; 62
 Les Eyzies, caves at, 40, 41
 L'Homme Mort, cave of, 86
 Lion, 20, 38
 Locmariaquer, menhir at, 96

- MADAGASCAR, 23; megaliths erected in, 98
 Magdalenian culture stage, 64, 68, 126
 Mammals, earliest, 18, 125
 Mammoth (*Elephas primigenius*)
 20; in Britain, 28, 36, 37, 67;
 51: Age of the, 63, 126; sketches
 of, 71-6: extinct in Britain, 80
 Man, advent of, 19-20: place of
 his first appearance, 23-5; in
 Britain, 26-8; evidence for existence
 of, 28, 35; earliest remains
 of, found in Britain, 36-8; on
 the Continent, 38-52; art of
 Primeval, 64-5; life of Primeval,
 71; habitations, 72; food, 73;
 clothing and ornaments, 75;
 art, 76; Neolithic, *chap. iv.*;
 remains of, 78, 82-4
 Marsupials, 19, 125
 Mas d'Azil, cave of, 86-7, 88
 Mastodon, 19
 Mauer jaw, 20: discovery of, 46-8
 Mediterranean Race, 82, 83, 84, 135
 Megaliths, 95-9, 133-4
 Melanesia, pottery in, 113; trepan-
 ning in, 118
 Metal Age, 32, 33
 Miocene Period, 19, 24, 58, 125
 Mousterian culture stage, 62-3, 68,
 126
 Music, 76

 NAVAHO Indians, 108
 Neandertal, skeleton found at,
 45-6; 49-50
 Neolithic (New Stone) Age, 30:
 typical implements of, 31-2,
 88-94, *chap. iv. passim*: monu-
 ments, 94-9; habitations, 100-7;
 agriculture, 109; industries,
 111-6; clothing and ornaments,
 117
 New Guinea, pile dwellings in, 102,
 103; boat-building in, 104-5;
 stone clubs in, 135
 New Zealand, 23; stones for
 pounding in, 111
 North America, pottery, 113;
 string, 115

 OCEAN, caves of, 87-8

 PALEOLITHIC (Old Stone) Age,
 30; typical implements of, 34;
 human remains of, *chap. ii.*;
 British implements, 66 *ff.*; tran-
 sition from, to Neolithic Age,
 77 *ff.*
 Pig, 71, 108
 Pile dwellings, 102-7
 Pit dwellings, 100
Pithecanthropus erectus, 25-6
 Placard Cave, 52
 Pleistocene Period, 20, 25, 28, 47,
 58, 68; *Appendix, Tables I, II*
 Pliocene Period, 19-20, 24, 25, 47;
Appendix, Table I
 Pottery, 113-4
 Predmost, human remains found
 at, 85, 130
 Pueblo Indians, 108

 REINDEER, 20: Age of the, 63, 64,
 84, 126; 76, 79, 80, 87: domesti-
 cation of, 108
 Religion, 120-1
 Rhinoceros, Etruscan (*R. etruscus*),
 19, 20, 47
 Rhinoceros, small-nosed (*R.*
Merkii), 20, 126
 Rhinoceros, woolly (*R. tichorhinus*),
 20, 36, 38, 67
 River-drift implements, 68-9
 Robenhausen, 104, 105-6

 SABRE-TOOTHED tiger (*Machairo-*
dus), 19, 71
 Samoyeds, and the domestication
 of the reindeer, 108
 Scotland, Neolithic Man in, 78-9;
 reindeer in, 80 *n.*; 87-8, 96: pile
 dwellings in, 102, 106: pottery
 in, 113: flax in, 115
 Sheep, 71, 80, 108
 Silbury Hill, 81, 95
 Solutré, 63, 64, 86
 Solutrian culture stage, 63, 64, 68,
 70, 126
 Spindle, 116
 Spy, skeletons found at, 45, 46
 Stalactite, stalagmite, 38, 41-2, 68
 Stanton Drew stone circles, 96
 Stirling, Carse of, 78-9
 Stone Age, 30; general survey of,
 118-21: Old Stone Age, *see*

- Palaeolithic Age ; New Stone Age, *see* Neolithic Age
 Stonehenge, 81, 96, 134
 String, making, 115-6
 Sutz, lake settlement at, 105
 Switzerland, 65 : lake dwellings.
 67, 102-6, 108, 110, 112, 116, 120
 TASMANIANS, 128
 Tattooing, Palaeolithic, 75 ; Neo-
 lithic, 117
 Textiles, 114
 Tierra del Fuego, natives of, 60,
 129 ; kitchen middens of, 132
 Tilbury, human remains found at,
 37
 Tools, use of, by Primeval Man,
 56 *ff.*
 Trepanning, 117-8
 URUS, 76, 79, 133
 WANGEN, lake settlement at,
 110
 Weaving, 116
 Whale, 79
 Wheat, 110
 Whitepark Bay, 113

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